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Module 1

Physiotherapy and Sports-Combination of Practices



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Glossary of terms:

Term/ Concept	Definition	Reference
Physical activity	Any bodily movement produced by skeletal muscles that requires energy expenditure.	WHO
Sedentary behavior (SB)	Is defined as time spent sitting or lying with low energy expenditure, while awake, in the context of occupational, educational, home and community settings and transportation.	WHO
Exercise	A subcategory of physical activity that is planned, structured, repetitive, and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness is the objective.	WHO
Sport	Sport covers a range of activities performed within a set of rules and undertaken as part of leisure or competition. Sporting activities involve physical activity carried out by teams or individuals and may be supported by an institutional framework, such as a sporting agency.	WHO
Occupational health	Occupational health is an area of work in public health to promote and maintain highest degree of physical, mental and social well-being of workers in all occupations.	WHO

Glossary of terms (cont'd):

Term/Concept	Definition	Reference
Functional exercises	Exercises that can be embedded into everyday tasks to improve lower-body strength, balance, and motor performance. Examples include tandem and one-leg stands, squatting, chair stands, toe raises, and stepping over obstacles.	WHO
Aerobic physical activity, Anaerobic physical activity	<p>Activity in which the body's large muscles move in a rhythmic manner for a sustained period of time.</p> <p>Aerobic activity, also called endurance activity, improves cardiorespiratory fitness. Examples include walking, running, swimming, and bicycling.</p> <p>Anaerobic physical activity consists of brief intense bursts of exercise, such as weightlifting and sprints, where oxygen demand surpasses oxygen supply.</p>	WHO
Musculoskeletal disorders / work-related musculoskeletal disorders	Musculoskeletal disorders (MSDs) can appear everywhere in the body, most commonly in back, neck, shoulders and upper limbs. Problems can be impairments of body structures such as muscles, joints, tendons, ligaments, nerves, bones or the local blood circulation system. When MSDs are caused by work and the work environment, they are called work-related MSDs	OSHWIKI

Introduction

- ⦿ Increasing sedentary occupations and personal motorized transportation promote sedentary behaviours (SB) associated with the incidence of cardiovascular disease, cancer, type-2 diabetes and all-cause mortality.
- ⦿ Regular physical activity is important for general well-being and healthy weight, as well as the key to the prevention of non-communicable diseases, and mental health problems and delaying the onset of dementia.
- ⦿ WHO advises adults to replace SB with any physical activity. Preferably aim for weekly physical activity from 150 to 300 minutes.



Introduction

The pandemic has forced many workers to expand to telework and hybrid work arrangements affecting their health, safety and well-being. Well-known occupational risks are for example injuries, noise, carcinogenic agents, and airborne particles. In this project, we focus on the ergonomic risks causing a variety of musculoskeletal problems such as back pain.

Knowledge is the key to healthier life and workforce. The effectiveness of home exercises can be affected by the level of adherence of the trainee, the support from physiotherapists or other qualified exercise professionals and the availability of exercise equipment.

Telehealth is used for the assessment, training, monitoring and/or implementation of health interventions by phone calls, text messages, mobile health or smartphone applications, web-based platforms and video conferences.

Learning Outcomes

After finishing the module, learner will be able to

- ① identify possible physical stresses and ergonomic challenges, including risks of prolonged sitting in his/her own office work.
- ② identify and use some preventive measures for less physically stressed and more ergonomic home office work.
- ③ plan, apply and adapt some personal preventive mini-break programs for office hours.

Keywords

Biomechanics; ergonomics; prevention; physical activity

Unit 1. Tele-health in exercise guidance

- ① The effectiveness of home exercises can be affected by the level of adherence of the trainee, the support from physiotherapists or other qualified exercise professionals and the availability of exercise equipment.
- ② Telehealth is used for the assessment, training, monitoring and/or implementation of health interventions by phone calls, text messages, mobile health or smartphone applications, web-based platforms and video conferences.
- ③ Read more: <https://academic.oup.com/ptj/article/100/10/1713/5879285>

Unit 1. Tele-health in exercise guidance

Physiotherapy defined by WCPT:

Physiotherapy aims to help people to improve their quality of life by taking into account their physical, psychological, emotional and social aspects of life. Physiotherapists help people to use their best ability in movement and function throughout their lifespan when well-being is threatened by ageing, injury, diseases, disorders, conditions or environmental factors.

Physiotherapists help people maximize their quality of life, looking at physical, psychological, emotional and social well-being. They work in the health areas of promotion, prevention, treatment/intervention, and rehabilitation.

 Source: <https://world.physio/resources/what-is-physiotherapy>

Unit 1. Tele-health in exercise guidance

Physical exercise and physical activity defined by WHO

- ⊙ "Physical activity is any bodily movement produced by skeletal muscles that requires energy expenditure."
- ⊙ "Exercise is a subcategory of physical activity that is planned, structured, repetitive, and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness is the objective."



“

"Physical exercise is physical activity that is pursued because of its desirable effects or for social reasons."

- Finnish institute for health and welfare
<https://thl.fi/en/web/lifestyles-and-nutrition/physical-exercise>

Unit 2. What to consider

Training principles

1. **Overload:** The need to progressively and individually gradually increase the power of the training resistance to increase physical condition
2. **Specificity:** According to the principle of specificity, a person should practice exactly the thing which he/she hopes to develop.
3. **Reversibility:** this means that training must be continued to maintain the benefits achieved through training.
4. **Individuality:** means that different individuals will not achieve the same results with the same training program, because the stressors of training are different for everyone.

Source:

- https://journals.lww.com/acsm-csmr/fulltext/2019/04000/sports_training_principles.2.aspx

- https://www.physio-pedia.com/Principles_of_Exercise_Physiology_and_Adaptation?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#

Unit 2. What to consider

Stressors of the exercises

Acute physiological, neuromuscular and metabolic responses to exercise are not permanent, but relative to changes in metabolic rate during exercise and are measured through oxygen consumption.

As training continues regularly, longer-term changes are achieved, such as the development of endurance, improvement of muscle power production and better control of the athlete's performance in the specific exercise that is trained.

Recovery after exercise in terms of heart rate, blood lactate concentration and breathing rate is important for the metabolism to return to the pre-exercise level. This is individual and enables access to good training performances in the future.

If you don't pay attention to adequate recovery after training, this can result in overfatigue and a weakening of muscle function, as well as an increased risk of injury, for example.

Source: https://www.physio-pedia.com/Principles_of_Exercise_Physiology_and_Adaptation?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#

Unit 2. What to consider

Biomechanics

Biomechanics combines knowledge of anatomy, physics and neuroscience. In this context, it refers to the forces, movement and legality produced by humans and controlled by nervous regulation.

Physiotherapy uses biomechanics to study the effects of different postures, movements and forms of exercise, as well as the external and internal forces acting on the musculoskeletal system, directed at different structures, to ensure the individuality and effectiveness of muscle fitness training.

Read more: Latash, M.L. 2016. Biomechanics as a window into the neural control of movement. Published online: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5260514/>

Unit 2. What to consider

Biomechanics Terms

Balance -Statics = the study of systems in constant motion (without acceleration) or at rest

Centre of mass = centre of gravity = point where the weight of the body is evenly distributed in every direction.
The place of the centre of gravity changes slightly depending on the body's proportions and movement.

ROM – range of motion Dynamics = studies forces and their effects on movement

Kinetics = studies the forces that cause motion

Kinematics = research that describes movement regardless of the causes of movement (e.g. acting forces)

Lever/Lever arm = Perpendicular distance of the line of action of the force from the fulcrum.

Plumb line = used in posture examination. Seen from the front, it passes, for example, through the nose, sternum, navel and between the crotch to the floor in the middle of the legs. In motion, passes through the centre of mass

Support surface = The part of the surface on which you work. Against this, the force can be produced (counterforce). The wider the support surface, the more stable the position

Rotational mechanics = mutual movement of two round bodies when they are attached either directly or indirectly.

Unit 2. What to consider

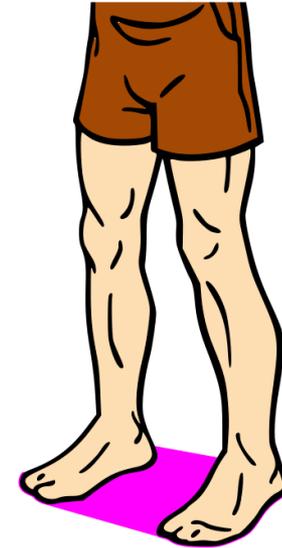
Factors affecting the difficulty of the exercise

Muscle power output

- Torque (lever arm)
- Resistance
- Movement speed
- Muscle length/joint angle
- Type of muscle contraction

Movement control

- The location of the center of gravity
- Support surface
- Number of moving body parts
- Movement levels
- Symmetry of the movements
- Movement speed
- Rhythm
- Orientation in space



Picture: <https://commons.wikimedia.org/wiki/File:Base-of-support.svg>

Unit 2. What to consider

Basic exercise prescriptions should individually follow the FITT mnemonic.

- ⦿ F- frequency: number of days per week
- ⦿ I- Intensity: low, moderate or vigorous
- ⦿ T- Time: minutes per session for endurance exercise
- ⦿ T- Type: endurance, strength, flexibility or some combination

⦿ https://www.physio-pedia.com/Therapeutic_Exercise

TOOL FOR GOAL SETTING

"THE GOLDEN RULE" SMART IDEA

SMART goal is:

S Specific = specific, individual, determined

M Measurable = measurable

A Achievable

R Realistic Relevant = realistic/significant,
achievable with rehabilitation measures

T Timed = possible to schedule

Picture: https://commons.wikimedia.org/wiki/File:SMART_goals_structure.jpg



Motor learning

Through practice, motor learning produces a permanent skill for the individual. For this reason, the learning process is always individual and should be planned and guided carefully.

Learning takes place about time and environment, as well as the individual's resources. The feedback received from the instructor, as well as self-reflection, help to perform the skill correctly and permanently.

— https://www.physio-pedia.com/Principles_of_Exercise?utm_source=physiopedia&utm_medium=related_articles&utm_campaign=ongoing_internal



“

“Some activity is better
than none, and more is
better than less”

-Dr. Ken Powell-

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7031771/>

Warning signs

- ⦿ Warning signs are usually scanned with the physiotherapist or doctor by interview.
- ⦿ These warning signs might be atypical pain, night pain, nausea, fever, decreased appetite, rapidly increased fatigue, progressive symptoms, and several cancer risk factors.
- ⦿ Make sure the physiotherapist or doctor has checked, that there is no need for further scanning, since with musculoskeletal problems there is always the whole picture to be considered and musculoskeletal pain itself can be very intense.

(Professionals painbook, 199-200 Luomajoki et al)

Best practices - Finland

- Muscle fitness and movement control training to support functioning - twice a week.
- Vigorous physical activity - at least 1 hour 15 minutes a week or moderate physical activity - at least 2 hours 30 minutes a week.
- Light physical activity – as often as possible, a few minutes at a time
- Breaks to sedentary behaviour – as often as you can.
- Enough restorative sleep



Best practices /WHO

Physical activity recommendation for adults aged 18-64 years

Regular physical activity is recommended for all adults for at least 150-300 minutes /per week of moderate-intensity aerobic activity

- Or 75-150 minutes/week of vigorous-intensity aerobic activity
- Or a combination of these two.

Still, you are encouraged to aim to do more than the minimum of physical activity in time and the recommended levels of moderate- to vigorous intensity.

At least twice a week do muscle strengthening exercises in all major muscle groups each week in moderate or greater intensity.

Also: Start step by step and limit sedentary time, replacing it with any physical activity for health benefits.

Unit 3. Benefits on being physically active during the workday

Prevention of common physical stresses in office work.

Promoting moving and exercise at work to avoid prolonged standing and sitting. Available at:

<https://oshwiki.osha.europa.eu/en/themes/promoting-moving-and-exercise-work-avoid-prolonged-standing-and-sitting>.

On the move — MSDs and avoiding prolonged static sitting at work.

Available at:

<https://osha.europa.eu/en/publications/move-msds-and-avoiding-prolonged-static-sitting-work>



“Our next posture is the best posture! Sit when you need to, stand when you want to, and walk or move when you can.”

- European Agency for Safety and Health at Work — EU-OSHA

Risks in sedentary behaviour

In cardiovascular diseases, cardiometabolic indicators such as type 2 diabetes, higher BMI and blood pressure were more likely to increase with sedentary behaviour.

Cardiovascular disease-related mortality is linked to total sedentary behaviour.

Cancer and cancer-related mortality combined with physical activity factor didn't have a such strong connection, but it still exists especially among those with the most sedentary behaviours.

Type-2 diabetes incidence was higher with sedentary behaviour.

Sedentary behaviour including a lot of sitting during the day is shown to be a big risk factor for all-cause mortality.

All physical activity comes with some risks or injuries, but with a moderate and gradual start, you can minimize the risks. Diabetes, high blood pressure and back pains linked to obesity and SB.

Positive signs for increased physical activity

It is recognized that sleep and health-related quality of life increase with both occasional and regular exercise.

Mental health and cognition (processing speed, memory, executive function, brain function and structure, and a reduced risk for Alzheimer's) have increased with regular physical activity.

With higher versus lower levels of physical activity anxiety and depression may be at lower probability risk.

Decreasing prolonged sitting or standing to increase the risk of oedema in the legs and MSDs in the back, neck and shoulders.

Identifying own opportunities for being physically active during the workday

The sedentary time at work can not be fully compensated by being active in your free time.

Reduce sitting time, and increase activity in leisure time.

Walk or cycle to work and back if you can

Pause your sitting time regularly; stand, do gymnastics or walk for a while instead.

Pause to move or stand for 2+ minutes every 20-30 minutes. Note that standing statically for long periods is also a risk factor.

Walk a bit during lunch or coffee breaks.

Use dynamic workstations if possible; walk, cycle or do steps while on the computer.

Find activating surfaces to stand on.

Look away from the computer screen regularly.

Set the ergonomics straight.

Assessment and evaluation of possible risks in own office and telework

- Self-reporting possible risks in own office and telework – Use of Risk assessment checklist by OSHA;

Available at: <<https://oshwiki.osha.europa.eu/en/themes/risk-assessment-and-telework-checklist>>.

- Use of FCOS learning modules. Federal Coordinator Commission for Occupational Safety FCOS. Swiss Confederation.

Available at: <<https://www.ekas-lernmodule.ch/en/courses>>.

A GENERAL, NON-EXHAUSTIVE CHECKLIST TO ASSESS RISKS WHILE TELEWORKING

This checklist should be used as a means of development support, not simply as a 'tick-the-box' exercise. The checklist below, which consists of a part for the teleworker (part A and B) and a part for the employer (part C and D), is based on positive statements (describing the situation to be reached) that invite reflection and action if necessary. If "YES", no further actions are required. If "NO", reflection and action are required. In this case, you are referred to the preventive measure section (part B for the teleworker, or part D for the employer). Actions can include optimisation of the workplace that the teleworker can do himself or can include a meeting between teleworker and supervisor to discuss and find a solution together. The preventive measures are presented as 'good practice' examples and are therefore not necessarily mandatory or relevant to all workplaces. The relevance will depend on the specificities of each workplace (and outcomes of risk assessments).

Preferably, there is an agreement about telework. The agreement is transparent and provides clear provisions / information on:

- Frequency of working from home and days / hours to be worked.
- Accessibility: periods that the teleworker is available and reachable, via which channels.
- Arrangements for the reimbursement of costs of (ergonomic) equipment.
- Expected output and results.
- Technical support for the use of ICT and software programs.
- ...

Part A and B: for the teleworker

Part C and D: for the employer

Part A consists of a checklist (i.e. positive statements to be reached) that the teleworker can use to evaluate occupational risks at the home-based workplace.

Part A General working environment – for the TELEWORKER		
1 Workplace environment		
	Statements (the situations to be reached)	Yes No
1.1	The space (room) is large enough to set up the workstation comfortably and ergonomically.	Yes No
1.2	The working space is properly cleaned and maintained.	Yes No
1.3	The air quality in the room is good (sufficient levels of ventilation, humidity, odor, drafts, fresh air, etc.).	Yes No
1.4	The temperature in the room is comfortable.	Yes No
1.5	The lighting (i.e. daylight, including additional artificial light if necessary) at the workplace is sufficient to perform tasks efficiently and accurately.	Yes No
1.6	The room has a window with an outside view.	Yes No
1.7	There are blinds at the window (light protection).	Yes No

- adjusting own ergonomics; walk breaks etc./ exercises etc; set of short exercise videos, max 30sec; example from Healthy Workplaces Lighten the Load 2020-2022

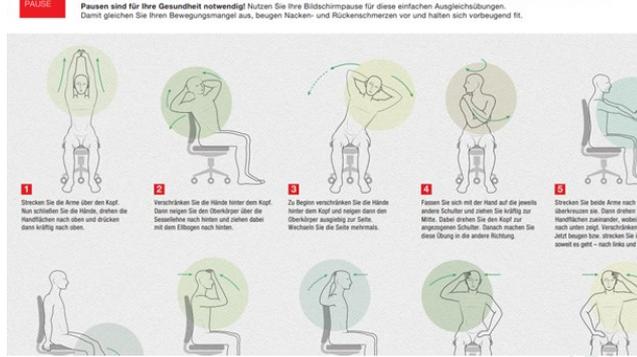
- Preventing musculoskeletal disorders when teleworking; Available at:

<https://osha.europa.eu/en/publications/preventing-musculoskeletal-disorders-when-teleworking>.

- And for example:

<https://www.unisanté.ch/fr/media/635/download>>

AKTIPP FÜR IHRE PAUSE **DIE 12 BILDSCHIRM-TIBETER**



unisanté
Centre universitaire de médecine générale
et santé publique · Lausanne

8 pointers for teleworking healthy

1. GETTING READY

A certain routine can be applied when working regularly from home. Although it is tempting to stay in your pajamas until 10 o'clock, we recommend keeping them for sleeping.

Once you wake up, proceed as if you have to go out: have breakfast, take a shower, get dressed and get ready!

2. FINDING A DEDICATED SPACE

The ideal is to separate, as much as possible, the professional space from the private one.

Install yourself in a quiet room so as to be able to concentrate; if that's not possible, try using headphones so as to be isolated. At the end of your day's work, so as to regain your private space, think of tidying away your working material.

3. ORGANIZING ONE'S WORKING DAY

A majority of teleworkers admit to an increase in their number of working hours, perhaps this is your case (shorter lunchtimes, finishing the working day later).

Overall Assessment

ASSESSMENT True / false

1. Symptoms like a typical pain, night pain, nausea, fever, decreased appetite, rapidly increased fatigue, progressive symptoms and several cancer risk factors need always urgent medical consultation. **TRUE**
2. Biomechanics combine knowledge of anatomy, physics and neuroscience. **TRUE**
3. WHO states that "Physical activity is any bodily movement produced by skeletal muscles that requires energy expenditure." **TRUE**
4. In teleworking healthy way, you should separate if possible, the professional space from the private one. **TRUE**

Overall Assessment ASSESSMENT

Match the Terms

Balance -Statics = the study of systems in constant motion (without acceleration) or at rest

ROM – range of motion Dynamics = studies forces and their effects on movement

Kinetics = studies the forces that cause motion

Kinematics = research that describes movement regardless of the causes of movement (e.g. acting forces)

Lever/Lever arm = Perpendicular distance of the line of action of the force from the fulcrum.

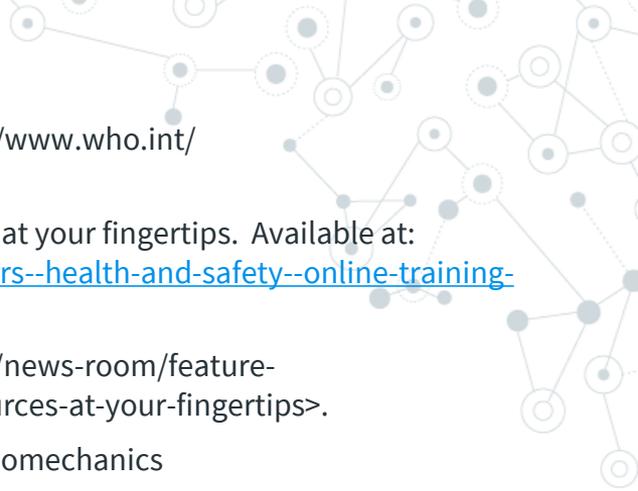
Support surface = The part of the surface on which you work. Against this, the force can be produced (counterforce). The wider the support surface, the more stable the position

Rotational mechanics = mutual movement of two round bodies when they are attached either directly or indirectly.



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- European Union information agency for occupational safety and health(EU-OSHA). 2012. Recommendations and interventions to decrease physical inactivity at work. Available at: < <https://oshwiki.osha.europa.eu/en/themes/recommendations-and-interventions-decrease-physical-inactivity-work>>.
- Healthy Workplaces - Lighten the Load 2020-22. European Agency for Safety and Health at Work. Available at:<https://healthy-workplaces.eu/en>.
- Healthy Workplaces - Lighten the Load 2020-22 Practical tools and guidance. European Agency for Safety and Health at Work. Available at: <<https://healthy-workplaces.eu/en/tools-and-publications/practical-tools>>.
- Kelcey A Bland, Ashley Bigaran, Kristin L Campbell, Mark Trevaskis, Eva M Zopf, Exercising in Isolation? The Role of Telehealth in Exercise Oncology During the COVID-19 Pandemic and Beyond, Physical Therapy, Volume 100, Issue 10, October 2020, Pages 1713–1716, <https://doi.org/10.1093/ptj/pzaa141>
- Maselli, F., Palladino, M., Barbari, V., Storari, L., Rossetini, G., & Testa, M. (2022). The diagnostic value of Red Flags in thoracolumbar pain: a systematic review. Disability and rehabilitation, 44(8), 1190–1206. <https://doi.org/10.1080/09638288.2020.1804626>

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- ① WHO 2020. Guidelines on physical activity and sedentary behaviour. <https://www.who.int/publications/i/item/9789240015128>
 - ① WHO 2022. Protecting workers' health and safety: Online training resources at your fingertips. Available at: <<https://www.who.int/news-room/feature-stories/detail/protecting-workers--health-and-safety--online-training-resources-at-your-fingertips>>.
 - ① WHO 2017. Protecting workers' health. Available at: < <https://www.who.int/news-room/feature-stories/detail/protecting-workers--health-and-safety--online-training-resources-at-your-fingertips>>.
 - ① University of Jyväskylä. 2023. Biomechanics. <https://www.jyu.fi/sport/en/biomechanics>



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Module 1

Physiotherapy and Sports-Combination of Practices Extra Resources



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Recommendations low back and neck

A European review of non-pharmacological treatment alternatives that are generally accepted in Europe.

Corp, N., Mansell, G., Stynes, S., Wynne-Jones, G., Morso, Hill, J.C., Van de Windt, D.A. 2020. Evidence based treatment recommendations for neck and low back pain across Europe: A systematic review of guidelines.

Read the article here: <https://onlinelibrary.wiley.com/doi/full/10.1002/ejp.1679>

Systematic review: shoulder

Some studies show that taking a break from work and taking short walks during the workday reduce pain conditions in the musculoskeletal system. In addition, according to some studies, stretching exercises lasting 6-8 weeks will help with musculoskeletal pain.

Read more:

🕒 Guduru, R.K.R, Domeika, A., Obcarskas, L. & Ylaite, B. 2022. The Ergonomic Association between Shoulder, Neck/Head Disorders and Sedentary Activity: A Systematic Review. Journal of Healthcare Engineering.

🕒 <https://www.hindawi.com/journals/jhe/2022/5178333/>

Clinical practice guidelines for physiotherapists: low back pain

- George, S.Z., Fritz, J.M., Silfies, S.P., Schneider, M.J., Beneciuk, J.M., Lentz, T.A., Grilliam, J.R., Hendren, S., Norman, K.S., Beattie, P.F., Bishop, M.D., Goertz, C., Hunter, S., Olson, K.A., Rundell, S.D., Schmidt, M., Shepard, M. & Vining, R. 2021. Interventions for the Management of Acute and Chronic Low Back Pain: Revision 2021. Journal of Orthopaedic & Sports Physical Therapy. Published online.
- Read more here: <https://www.jospt.org/doi/10.2519/jospt.2021.0304>

Further reading for own interest:

Cohen, S. P., Vase, L., & Hooten, W. M. (2021). Chronic pain: an update on burden, best practices, and new advances. *Lancet* (London, England), 397(10289), 2082–2097.
[https://doi.org/10.1016/S0140-6736\(21\)00393-7](https://doi.org/10.1016/S0140-6736(21)00393-7)

Principles of Exercise Physiology and Adaptation. Wanda van Niekerk(ed.). In Physiopedia. Available at:

https://www.physio-pedia.com/Principles_of_Exercise_Physiology_and_Adaptation?utm_source=physiopedia&%20utm_medium=search&utm_campaign=ongoing_internal# .

Seeberg, K.G.V., Andersen, L.L., Bengtson, E. et al. Effectiveness of workplace interventions in rehabilitating musculoskeletal disorders and preventing its consequences among workers with physical and sedentary employment: systematic review protocol. *Syst Rev* 8, 219 (2019).
<https://doi.org/10.1186/s13643-019-1127-0>

World Health Organization & Institution of Occupational Safety and Health. Open WHO. COVID-19 and work: Staying healthy and safe at work during the COVID-19 pandemic. Available at:

<https://openwho.org/courses/COVID-19-and-work>

Further reading for own interest:

Vachinska, S., Markova, V., Ganchev, T. (2022). A Risk Assessment Study on Musculoskeletal Disorders in Computer Users Based on A Modified Nordic Musculoskeletal Questionnaire. In: Sotirov, S.S., Pencheva, T., Kacprzyk, J., Atanassov, K.T., Sotirova, E., Staneva, G. (eds) Contemporary Methods in Bioinformatics and Biomedicine and Their Applications. BioInfoMed 2020. Lecture Notes in Networks and Systems, vol 374. Springer, Cham. https://doi.org/10.1007/978-3-030-96638-6_45

World Health Organization. Healthy and safe telework. Available at: <https://openwho.org/courses/telework>

World Health Organization. Occupational health and safety for health workers in the context of COVID-19. Available at: <https://openwho.org/courses/COVID-19-occupational-health-and-safety>



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*Module 2 Theory:
Digital Practices in Physiotherapy and Sports Training*

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Learning Outcomes

Through this module, the learner will get informed about the new trends technology leads in physiotherapy and physical exercises, and different technologies that can assist such as AR and wearable devices and will receive recommendations on how to deal with remote digital performance in this sector.

Keywords

- Remote education, Telerehabilitation, Wearable devices and sensors, Remote monitoring, Rehabilitation gamification, Performance analysis software, Virtual reality and simulation systems, Video analysis tools .

Estimated seat time

- To complete the module, you will have to spend approximately 3 hours

Glossary of terms of Digital Practices:

Term / Concept	Definition	Reference
Telerehabilitation	This allows patients to receive physiotherapy treatment remotely via video conferencing or other digital communication methods. Telerehabilitation has been developed to take care of inpatients, transferring them home after the acute phase of the disease to reduce patient hospitalization times and costs to both patients and health care providers. Telerehabilitation allows for the treatment of the acute phase of diseases by substituting the traditional face-to-face approach in the patient-rehabilitator interaction.	Carey et al., 2007
Wearable devices and sensors	Devices that can monitor and track individuals' physical activity and progress provide valuable data and feedback. Wearable gadgets or devices are electronic gadgets worn by users to track biometric information identified with well-being or wellness.	Chopra, Singhal, 2021
Electronic health records (EHRs)	Allows physiotherapists to securely store and access patients' medical records and treatment plans, improving communication and coordination of care between healthcare providers. An EHR is an electronic version of a patient's health record that was historically created, used, and stored in a paper chart.	Seymour, (2014).
Rehabilitation gamification	Comprises using game-like elements to make physiotherapy exercises more engaging and fun for patients. In general, researchers have recognized gamification as using the game elements or game mechanics in activities that do not represent a gaming context, such as learning, teaching, and healthcare, while preserving the playfulness of the environment.	Deterding et al., 2011; Hamari et al., 2014

Glossary of terms of Digital Practices:

Term / Concept	Definition	Reference
Remote monitoring and remote patient management	Enables physiotherapists to remotely monitor patients' progress, adjust treatment plans as needed, and communicate with patients using digital tools. Remote patient monitoring (RPM) uses digital technologies to collect medical and other health data from a patient in one location while electronically transmitting that information securely to a healthcare provider in a different place.	Center for Connected Health Policy, Remote Patient Monitoring (RPM).
Performance analysis software	The software analyzes an athlete's performance, including technique, strategy, and physical movements, providing insights for improvement.	Liu, Yang, 2021
Video analysis tools	Tools which allow coaches and trainers to review and analyze video footage of an athlete's performance, providing a visual representation of their strengths and weaknesses.	Liu, Yang, 2021
Virtual reality and simulation systems	Systems which simulate game scenarios and situations, allowing athletes to practice and get prepared for real-world competition. VR is a visual-based computer simulation which can reproduce a realistic and controlled environment.	Marszałek et al., 2019
Training and nutrition tracking	Involves using digital tools to track and monitor an athlete's training and nutrition, providing information for personalized and effective training plans.	de Moraes Lopes et al., 2020

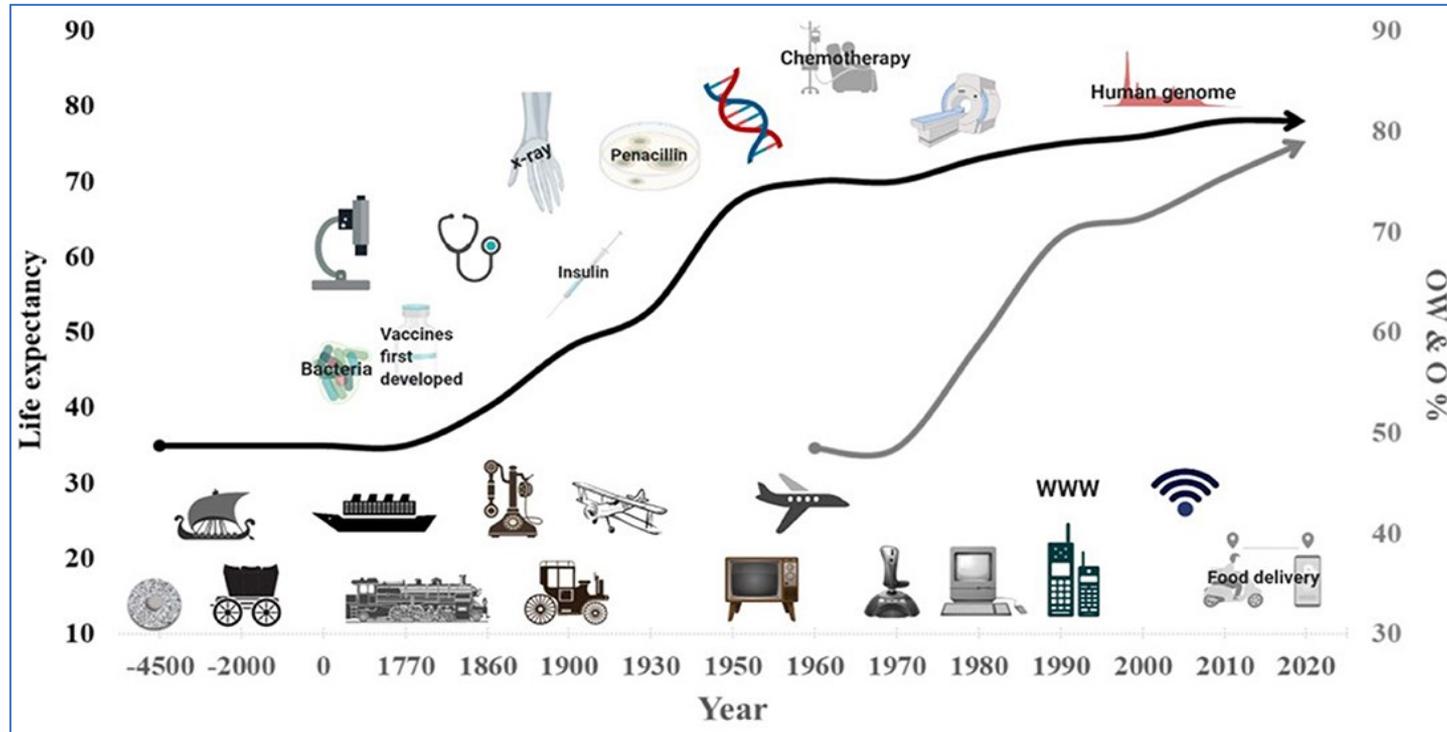
Unit 1 Digitality Evolution

INTRODUCTION

According to the latest statistics:

- roughly 63 % of the world's population is now online (Measuring Digital Development, 2021);
- more than 90% of European (Eurostat data, 2022; van Kessel et al., 2022) and the U.S. population reported using the Internet (Poushter, 2016).
- ◎ ICT is increasingly used all over the world, not only in everyday activities or in business, but they are also rapidly entering the educational process.
- ◎ Digital practices in physiotherapy and sports training can improve patient's and sportsmen's outcomes, increase access to care and enhance the efficiency and convenience of client's services/ training and development, providing valuable insights and data for PTs and trainers.

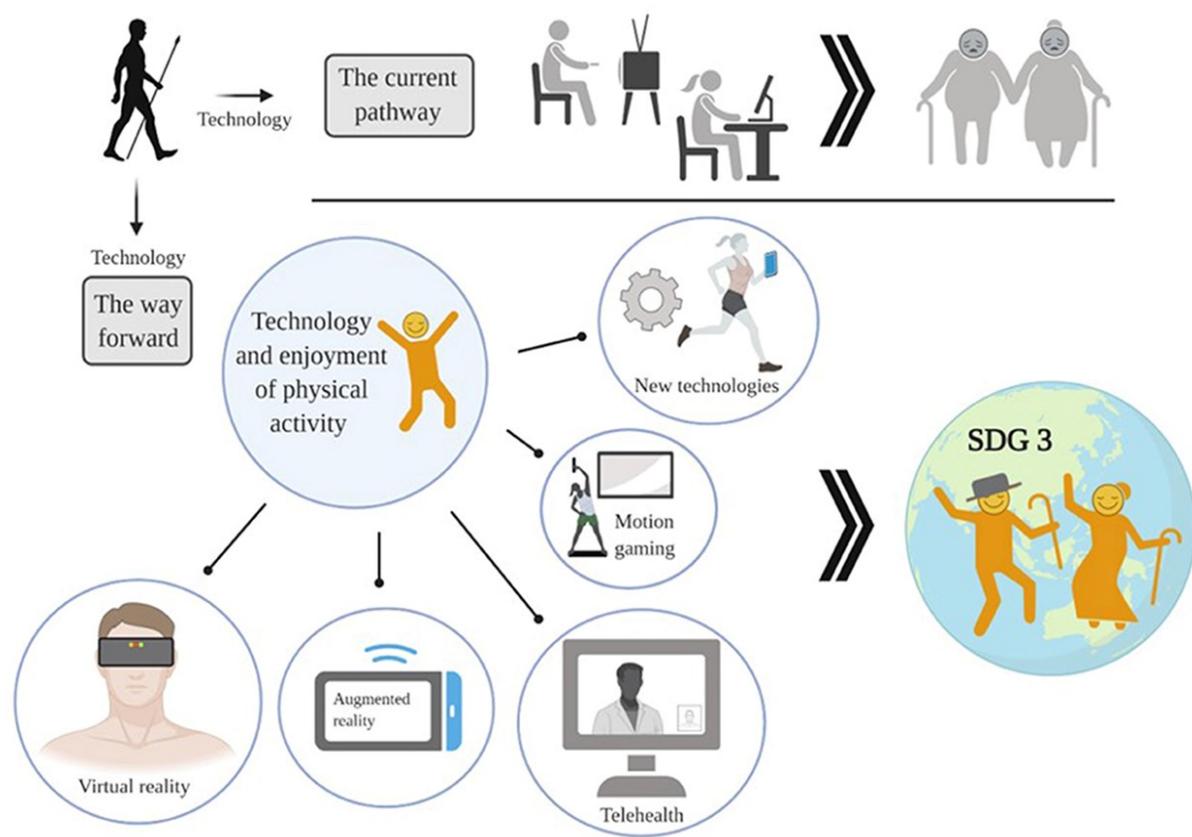
TECHNOLOGIES EVOLUTION AND PHYSICAL ACTIVITY INTERRELATIONSHIP



Woessner et al. (2021) The Evolution of Technology and Physical Inactivity: The Good, the Bad, and the Way Forward. *Front. Public Health* 9:655491.

Increased life expectancy (black line) and trends in overweight and obesity (OW and O, grey line) due to advanced technology and medical treatment

Technology leads to inactivity, but it can also help to be active!



Woessner et al. (2021) The Evolution of Technology and Physical Inactivity: The Good, the Bad, and the Way Forward. Front. Public Health

Currently, technology promotes sedentary lifestyles and physical inactivity, but technology has enormous potential to use it to promote greater engagement and enjoyment of the physical activity. This will contribute to UN SDG no. 3 goals and indicators, ensuring health and well-being for all.

ICT APPLICATIONS IN EDUCATION

- Started with the use of the desktop PC in ~1996;
- followed by e-learning in 2003~ using the Internet PC,
- afterwar m-learning in 2005~ using the Notebook and PDA (Personal Digital Assistant),
- with later upcoming u-learning in 2010 using smartphones.
- The year 2012 was the start of the era of Smart Education, with the use of several devices in education,
- Use of virtual or augmented reality.



(Kitowski et al., 2015; Rutkauskaite et al., 2022).

Unit 2 Technology trends in Physiotherapy and Sports- Distant Guidance

Digital training sessions in physiotherapy and sport training features

- ① **Convenience:** Digital training sessions offer patients the convenience of receiving therapy from the comfort of their own homes, or the location of their choice.
- ② **Personalized Training:** Digital training sessions allow for personalized training plans that can be tailored to the specific needs and goals of each patient.
- ③ **Real-time Feedback:** Digital training sessions provide patients with real-time feedback on their performance, which can help them to improve their technique and achieve their therapy goals.
- ④ **Access to Expertise:** Digital training sessions provide patients with access to a qualified physiotherapist who can guide them through their exercises and provide support.

Digital training sessions in physiotherapy and sport training features

- ① **Flexibility:** Digital training sessions offer patients the flexibility to participate in therapy at a time that is convenient for them.
- ① **Ease of Use:** Digital training sessions typically use user-friendly software and devices, making it easy for patients to participate in therapy.
- ① **Data Tracking:** Digital training sessions enable patients to track their progress and monitor their goals, allowing them to see the results of their therapy over time.
- ① **Cost-Effective:** Digital training sessions can be a more cost-effective alternative to in-person therapy sessions, especially for patients who live in remote areas or have limited mobility.

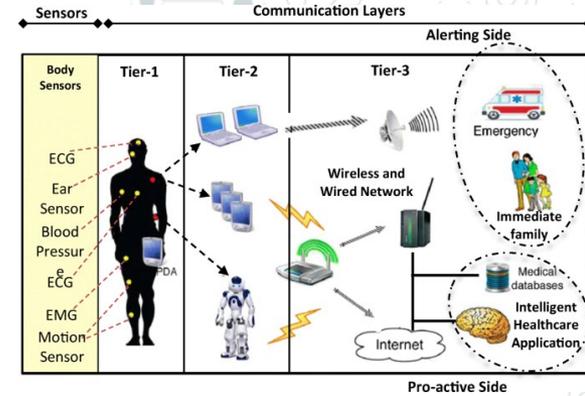
Technologies used in distant guidance

- **Video conferencing:** This technology allows individuals to communicate in realtime through audio and video, making it possible to provide guidance and support remotely. Examples of video conferencing platforms include Zoom, Skype, and Google Meet.
- **Remote monitoring:** This technology allows for remote monitoring of an individual's performance, providing data and feedback for improvement.
- **Augmented and virtual reality:** These technologies can be used to create immersive experiences for remote guidance, allowing individuals to practice and receive feedback in simulated environments.
- **Mobile applications:** Mobile apps can be used to provide guidance and support through a user-friendly interface on a smartphone or tablet.
- **Wearable devices:** Wearable devices such as smartwatches and fitness trackers can be used to monitor and track an individual's progress and provide feedback in realtime.

Wearable devices and sensors

These are small, portable electronic devices that are designed to be worn on the body or attached to clothing or accessories. These devices typically include sensors that can detect and measure various physiological and environmental factors, such as:

- heart rate,
- activity level,
- sleep quality,
- temperature,
- air quality.



a Smart Watch



b Nike Coach



Wearable devices and sensors

Wearable innovation develops the quantity and kind of information that wearable gadgets gather. For instance, the data that wearable gadgets gather isn't restricted to individuals' biomedical data, but, also their geological area, social collaborations, and the huge number of higher resolution photographs and recordings that are currently in like manner utilization for most web-based media stages.

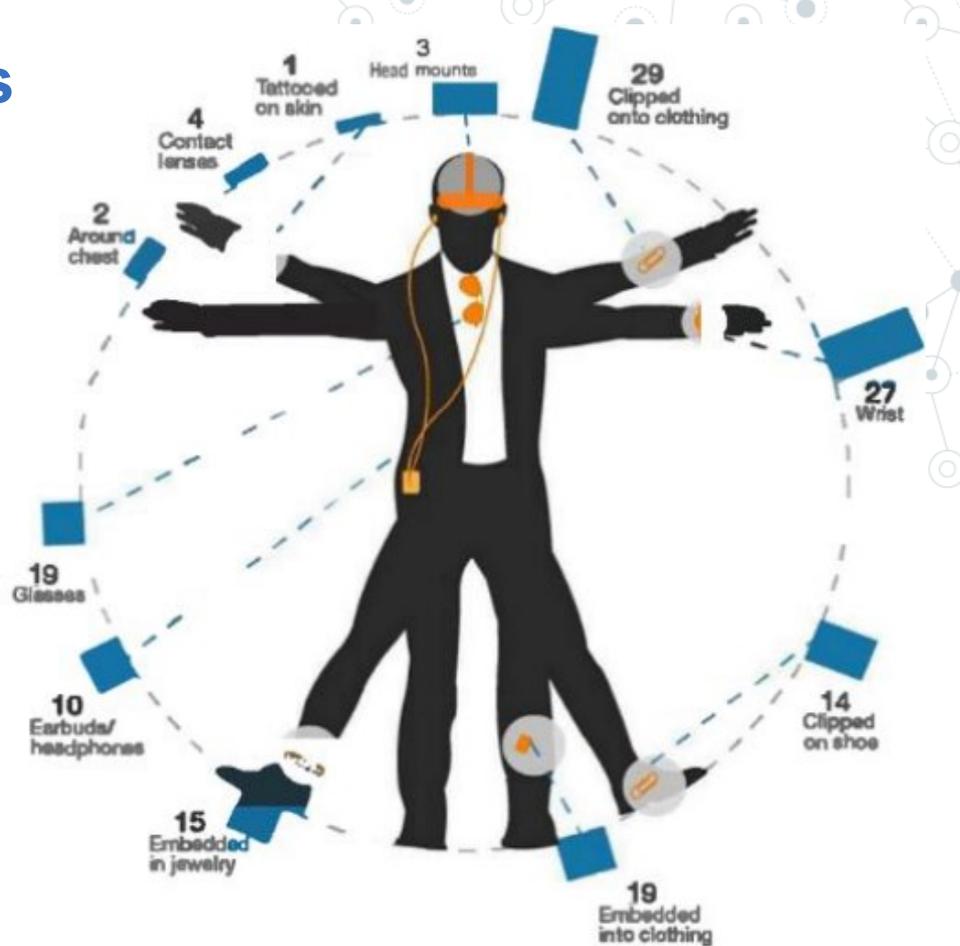
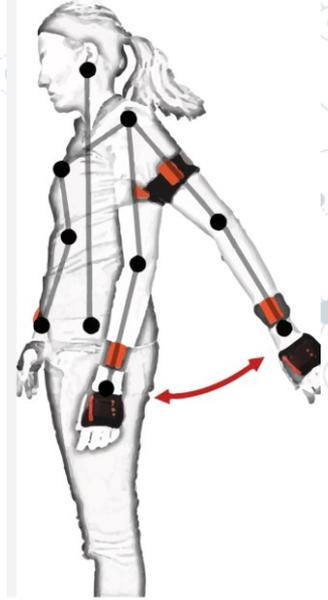


Fig. [Categorized Device Preferences](#) (Singhal, Ankit & Chopra, Aakanksha. (2021). Understanding the Wearable Technology. SSRN Electronic Journal)

Wearable devices and sensors

Examples

- ◎ fitness trackers,
- ◎ smartwatches,
- ◎ smart clothing,
- ◎ medical monitoring devices, and
- ◎ environmental sensors.



These devices can provide real-time data about the wearer's health and behaviour, which monitor and improve overall wellness, diagnose and treat medical conditions, and inform research and development in various fields.



Remote Monitoring

- ◎ Remote monitoring is a method of healthcare delivery that involves using technology to monitor patients outside of traditional healthcare settings. This approach allows healthcare providers to track patients' health status and detect any changes or concerns remotely, without requiring them to be physically present in the same location.
- ◎ Remote monitoring can involve various types of technology, such as wearable devices, sensors, mobile apps, and telehealth platforms. Some examples of remote monitoring applications include monitoring patients with chronic conditions,
 - such as diabetes or heart disease,
 - monitoring post-surgery recovery,
 - monitoring patients in intensive care units.



FIGURE by [Heres Arantes Junqueira](#)

Remote Monitoring

Remote monitoring has several potential benefits, including improved access to healthcare services, reduced healthcare costs, improved patient outcomes, and increased patient satisfaction. It can also help reduce the burden on healthcare providers and improve the efficiency of healthcare delivery.

However, there are also some challenges associated with remote monitoring, such as concerns about data privacy and security, the need for reliable technology infrastructure, and the need for effective communication and coordination between patients and healthcare providers.

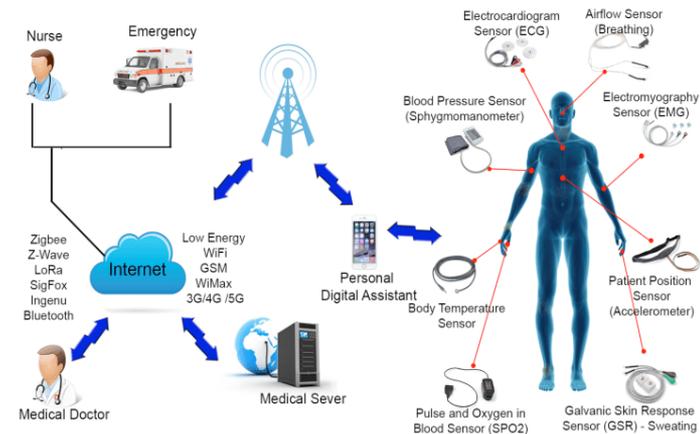
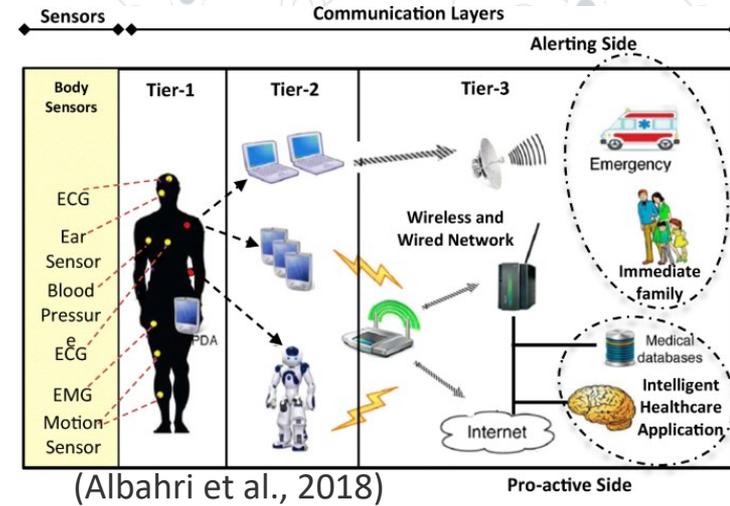


FIGURE by [Heres Arantes Junqueira](#)

Unit 3 Augmented Reality in Physiotherapy

Augmented Reality (AR) technology can enhance physiotherapy by providing real-time feedback and guidance to patients during exercises, allowing for more effective and efficient rehabilitation.

AR can display virtual instructions, animations, and simulations, helping to improve patient understanding and compliance.

AR can also track and assess a patient's progress, providing objective measurements for the physiotherapist to adjust the treatment plan.

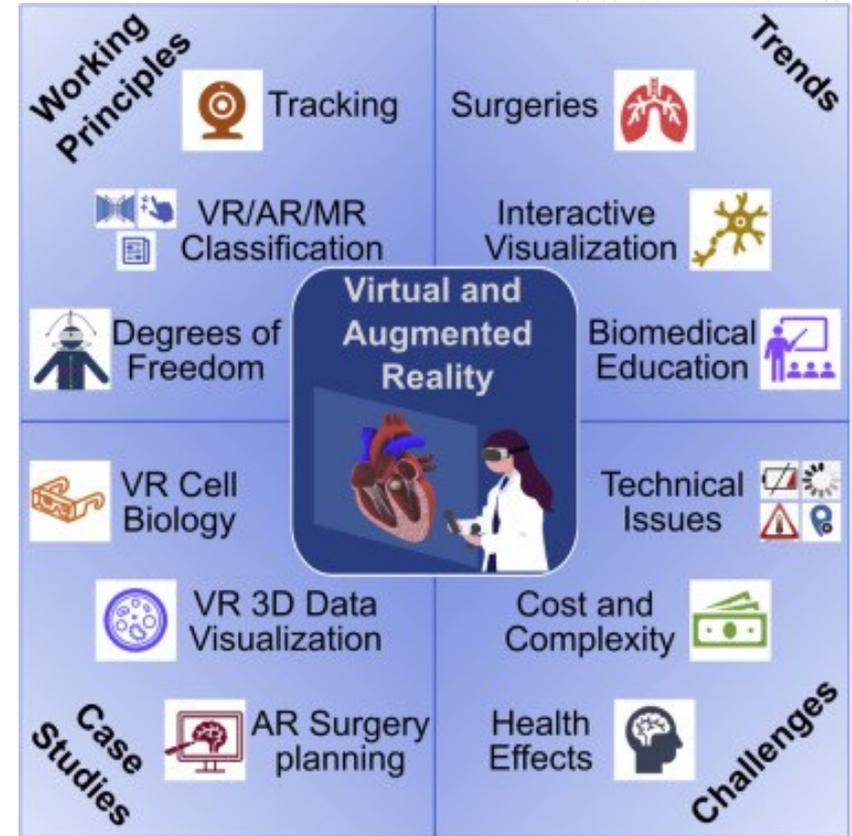
In addition, AR can provide a fun and engaging experience for the patient, increasing their motivation and overall satisfaction with the therapy.



VIRTUAL REALITY CHARACTERISTICS

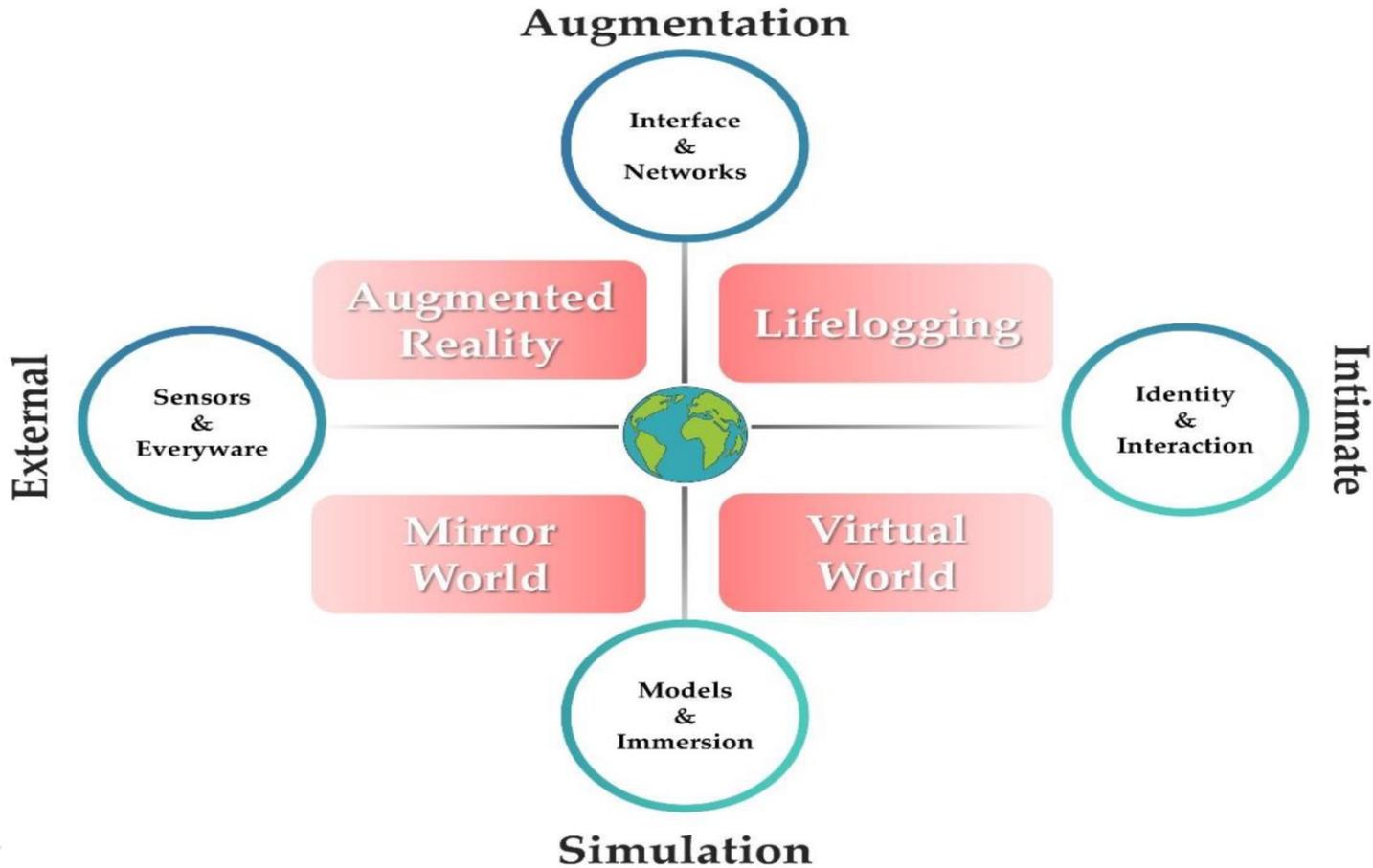


- Working principles with virtual and augmented reality
- Trends in work with virtual and augmented reality
- Case studies in work with virtual and augmented reality
- Challenges work with virtual and augmented reality



Augmented reality technology in Physiotherapy

The widely accepted concept of the metaverse involves the convergence of virtual and physical realities in a permanent virtual space. It can be described as a 3D virtual space where social and economic activities similar to those in the real world occur, or as a digitized world accessible through digital media such as smartphones and computers. Some scholars define it as a virtual world where individuals conduct their daily activities and economic life through an avatar that represents them in real life, and where the boundaries between virtual and real-life experiences are blurred. Additionally, it is a space where social, economic, and cultural activities occur, creating value in an advancing world. (Ji-Eun Yu , 2022)



In Figure 1. Quadrant-based metaverse type is introduced; the horizontal axis represents the relationship between “Technology” and “User”, and the vertical axis represents the relationship between “Technology” and “Reality” (Yu, 2022)

Main features of AR

Enhanced Visual Experience: AR enhances the real world by adding virtual elements to it in real time.

Interactivity: AR allows users to interact with the virtual elements in a real-world environment.

Real-time Information: AR provides real-time information and updates to users in their environment.

Context Awareness: AR adjusts virtual elements based on the user's physical environment and context.

Cross-Platform: AR is supported on a variety of devices and platforms, including smartphones, tablets, and wearable devices.

Wide Range of Applications: AR has a wide range of applications across industries, such as education, gaming, retail, healthcare, and tourism.

Integration with Other Technologies: AR can be integrated with other technologies, such as artificial intelligence, machine learning, and computer vision, to enhance its capabilities and applications.

Need for **specialized equipment and training**, and the potential for sensory overload or motion sickness in some patients.

Augmentation



Enhanced Visual Experiences

Augmented reality technology in Physiotherapy

In physiotherapy, AR or VR can be used to provide patients with interactive and engaging exercises and activities that can help improve their physical function and mobility.

For example, AR can be used to display virtual objects or instructions in the patient's environment to help them perform exercises with proper form and technique.

VR can be used to create immersive environments that simulate real-world scenarios, such as:

- as walking on uneven terrain,
- climbing stairs,
- helping patients practice and improve their functional skills.

Unit 4 Digital Practices

Recommendations & Factors

Recommendations

- Start with a clear understanding of the goals and objectives: Before implementing any digital tools, it is important to have a clear understanding of the goals and objectives of the practice and how digital tools can support these goals.
- Ensure patient privacy and security: Digital platforms should comply with relevant privacy and security regulations and use secure methods for storing and transmitting patient data.
- Encourage patient / athlete engagement: Digital tools can be used to encourage patient engagement, such as through the use of interactive exercise programs and progress tracking.
- Provide training and support: It is important to provide training and support to both physiotherapists and patients to ensure that digital tools are used effectively and efficiently.
- Continuously evaluate and improve: Regularly evaluate and improve the use of digital tools to ensure that they are supporting the goals of the practice and providing the best possible care to patients /athletes.
- Foster collaboration with other healthcare providers / performance professionals: Digital platforms can support collaboration with other healthcare providers, such as through the use of telemedicine and the sharing of patient information.

Factors to consider in Physiotherapy and Sport training Digital Practices

- ① **Patient /athlete privacy and security:** Ensuring that patient data is protected and secure is essential, and digital platforms should comply with relevant privacy and security regulations, such as HIPAA in the US.
- ② **Evidence-based practices:** Digital tools should be based on evidence-based practices and be supported by current research in the field of physiotherapy.
- ③ **User-friendliness:** The platform should be user-friendly, intuitive, and accessible to both physiotherapists and patients, especially those with limited technology experience.
- ④ **Integration with other healthcare / health and performance systems:** Digital platforms should be able to integrate with other healthcare systems, such as electronic medical records (EMRs) and telemedicine platforms, to ensure seamless and efficient patient /athlete care/ performance.
- ⑤ **Customization and flexibility:** Digital platforms should offer customization and flexibility to meet the specific needs of individual physiotherapy practices and patients.
- ⑥ **Cost-effectiveness:** Digital platforms should offer cost-effective solutions for physiotherapy practices, both in terms of software costs and the costs of integrating the platform into existing workflows.
- ⑦ **Technical support:** Adequate technical support should be available to assist with any issues that may arise with the platform.



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NUOTRAUKA IŠ <https://indatalabs.com/blog/fitness-augmented-reality>
<https://www.nature.com/articles/s41746-022-00568-y>

ASSESSMENT Quiz

1. Select from the list the technologies applied in the distant implementation of physiotherapy and physical exercise

Augmented and virtual reality

Mobile applications

Wearable devices

Web Games

E-learning platforms

2. Match the concepts

Clear understanding: Goals and objectives of the practice and how digital tools can support these goals.

Patient privacy and security: Data Regulations

Encourage patient/athlete engagement: The use of interactive exercise programs and progress tracking.

Provide training and support: Ensure that digital tools are used effectively and efficiently.

Continuous evaluation and improvement: Ensure that tools are supporting the goals of the practice and providing the best possible care to patients /athletes.

Foster collaboration with other healthcare professionals: Telemedicine and the sharing of patient information.

ASSESSMENT Quiz

3. Technologies can help people to be active.
4. Digital training sessions are not a cost-effective alternative to in-person therapy sessions.
5. Wearable devices and sensors may measure sleep quality.

True

False

True

False

True

False



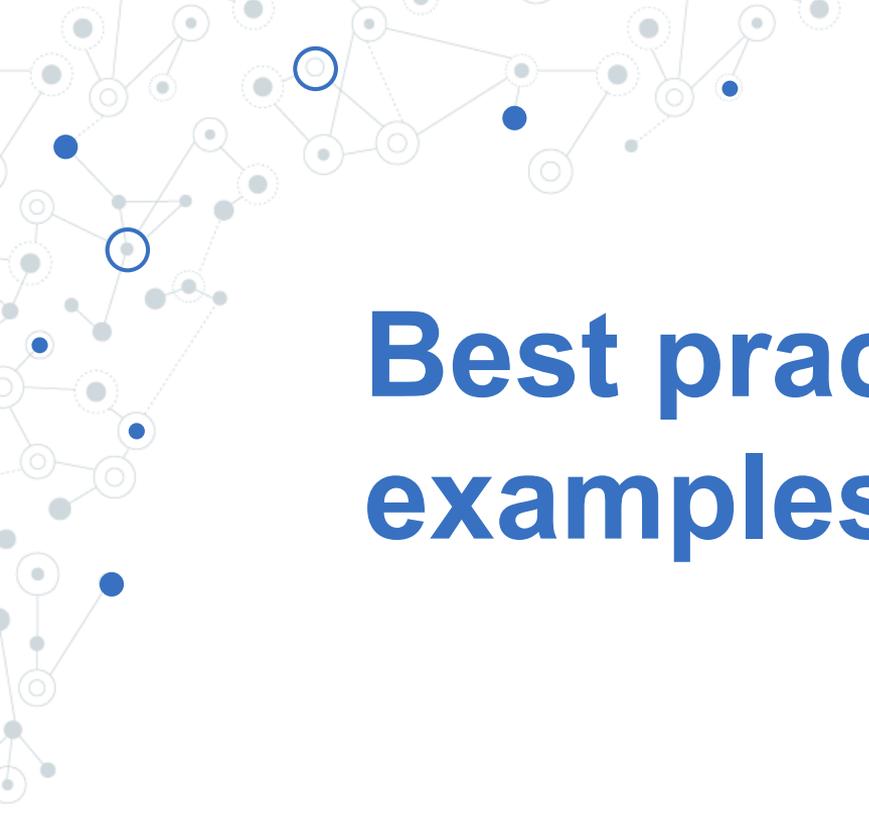
Project No: 2021-2-NL01-KA220-VET-000049424

Module 2
Digital Practices in Physiotherapy and
Sports Training
Best Practices & Resources



**Co-funded by
the European Union**

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A decorative network diagram in the top-left corner, featuring a complex web of interconnected nodes and lines. Some nodes are highlighted with blue circles, and others with solid blue dots. The lines are thin and light gray.

Best practice examples



Perception of Height in Virtual Reality — A Study of Climbing Stairs

- In this paper was simulated stair climbing, and evaluated how well people could assess the distance they had climbed after several minutes of the activity under various conditions.
- Factors were varied such as the presence of virtual feet (shoes), whether the stairwell was open or enclosed, the presence or absence of passive haptic markers, and whether a subject was ascending or descending.
- In general, the distance climbed or descended was overestimated, consistent with prior work on the perception of height.
- Subjects have significantly better ability to estimate their error with the presence of virtual shoes than without, and when the environment was open. Having shoes also resulted in significantly higher ratings of presence.
- Significant tendency for females show higher ratings of simulator sickness.

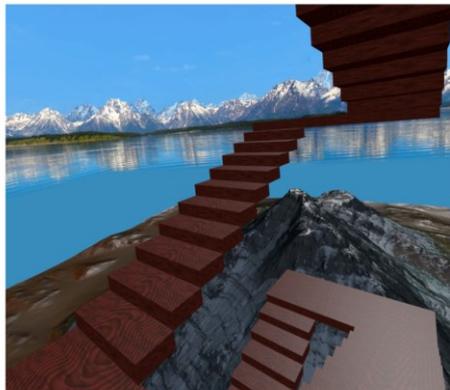


Figure 1: View of the open virtual environment.

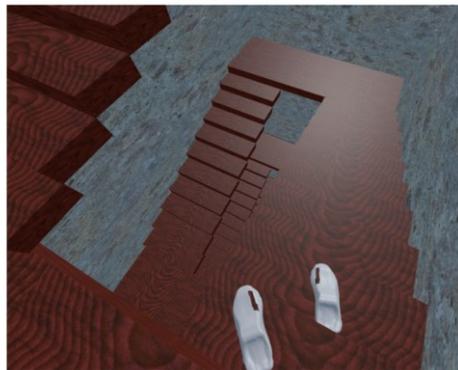


Figure 2: View of the closed virtual environment and the virtual shoes used.

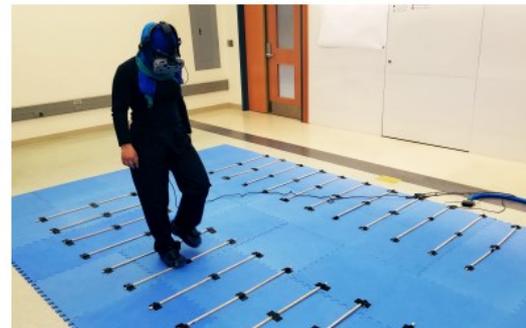
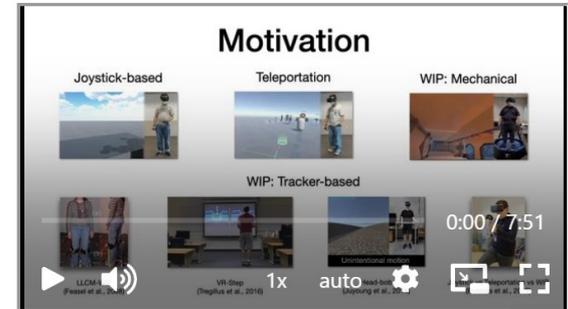


Figure 3: A participant climbs the virtual stairwell with passive haptic feedback.

Understanding user experiences across VR Walking-in-Place locomotion methods

- Navigating large-scale virtual spaces is a major challenge in Virtual Reality (VR) applications due to real-world spatial limitations.
- Walking-in-place (WIP) locomotion solutions may provide a natural approach for VR use cases that require locomotion to share similar qualities with walking in real-life.
- 40 participants that experienced several easy-to-setup WIP methods in a VR commuting simulation.
- A nuanced understanding of cybersickness and exertion relationships and walking affordances based on different tracker setups were among the findings derived from a corroborated analysis of think-aloud, interview, and observational data, supplemented with self-reports of VR sickness, presence and flow. Practical design insights were then constructed along the dimensions of cybersickness, affordances, space and user interfaces.

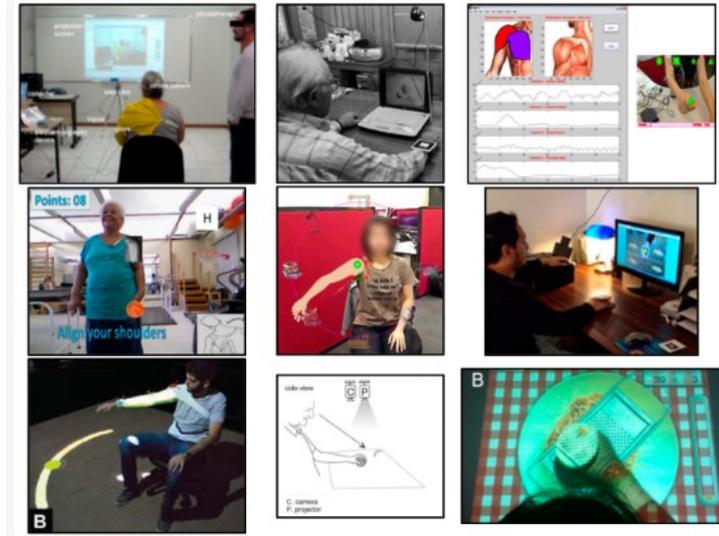
Tan et al., (2022). Understanding user experiences across VR Walking-in-Place locomotion methods. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (pp. 1-13).



Review of the Augmented Reality Systems for Shoulder Rehabilitation

- Study aimed to analyze to what extent AR applications are used in shoulder rehabilitation, examining wearable/non-wearable technologies employed, and investigating the evidence supporting AR effectiveness.
- Nine AR systems were identified and analyzed in terms of:
 - Tracking methods, visualization technologies, integrated feedback, rehabilitation setting, and clinical evaluation.
- Findings show that all these systems utilize vision-based registration, mainly with wearable marker-based tracking, and spatial displays.
- No system uses head-mounted displays, and only one system (11%) integrates a wearable interface (for tactile feedback).
- Three systems (33%) provide only visual feedback; 66% present visual-audio feedback, and only 33% of these provide visual-audio feedback, 22% visual-audio with biofeedback, and 11% visual-audio with haptic feedback. Moreover, several systems (44%) are designed primarily for home settings.
- Three systems (33%) have been successfully evaluated in clinical trials with more than 10 patients, showing advantages over traditional rehabilitation methods.

Figure 1. The nine AR Rehab Systems: NeuroR (top-left), ARS (top-center), RehaBio (top-right), MirrARbilitation (middle-left), ARIS (middle-center), AR Games by De Leon et al. (middle-right), SleeveAR (bottom-left), AR Fruit Ninja (bottom-center), and AR System by Colomer et al. (bottom-right)



Viglialoro et al., (2019). Review of the augmented reality systems for shoulder rehabilitation. *Information*, 10(5), 154.

Rehabilitation for balance and mobility

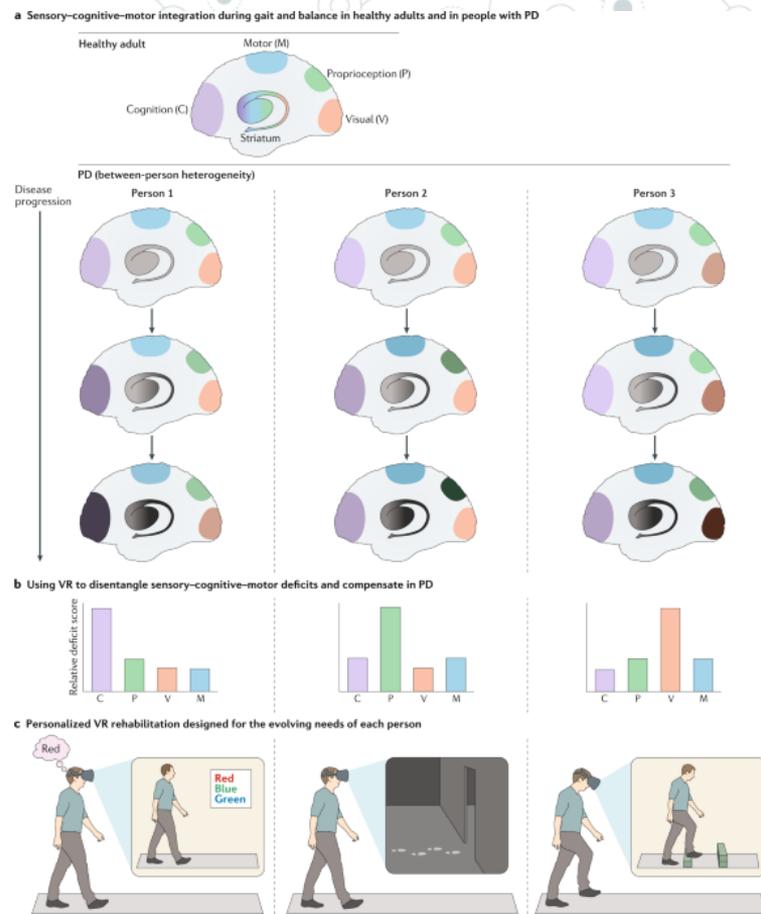
Virtual reality balance training to improve balance and mobility in Parkinson's disease: a systematic review and meta-analysis

- ① A study evaluated the use of a VR system to improve balance and mobility in patients with Parkinson's disease.
- ① The VR system consisted of a treadmill, a motion-capture system, and a VR environment that simulated walking on a path in a park.
- ① The study found that the use of the VR system improved patients' balance and gait velocity.

Sarasso et al., (2021). Virtual reality balance training to improve balance and mobility in Parkinson's disease: a systematic review and meta-analysis. *Journal of neurology*, 1-16.

Virtual reality in research and rehabilitation of gait and balance in Parkinson disease

- A study evaluated the use of a VR system to improve balance and mobility in patients with Parkinson's disease.
- The VR system consisted of a treadmill, a motion-capture system, and a VR environment that simulated walking on a path in a park.
- The study found that the use of the VR system improved the patients' balance and gait velocity.



Canning, et al., (2020). Virtual reality in research and rehabilitation of gait and balance in Parkinson disease. *Nature Reviews Neurology*, 16(8), 409-425. <https://doi.org/10.1038/s41582-020-0370-2>

Augmented Reality Game for Rehabilitation of Patients With Upper Limb Deficits from Stroke

The goal of this study was to assess the acceptability of a smartphone-based augmented reality game as a means of delivering stroke rehabilitation for patients with upper limb motor function loss.

The patients with upper limb motor deficits following stroke who participated in the study found augmented reality game motivating, comfortable, engaging, and tolerable.

Improvements in augmented reality technology may one day allow patients to work with improved versions of this therapy independently in their own homes.

A.



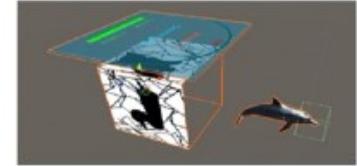
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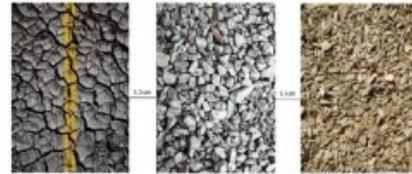
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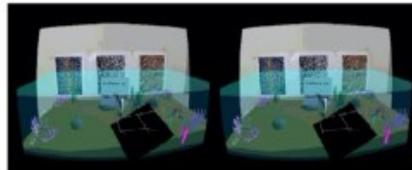
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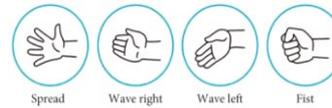
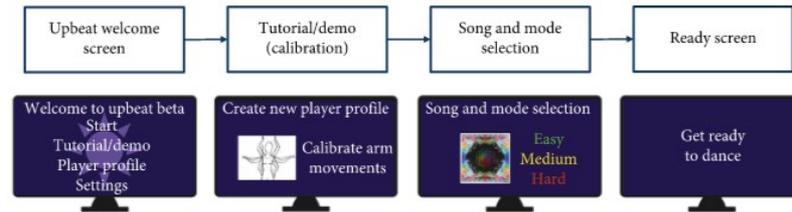


LaPiana, et al., (2020). Acceptability of a mobile phone-based augmented reality game for rehabilitation of patients with upper limb deficits from stroke: Case study. *JMIR rehabilitation and assistive technologies*, 7(2), e17822. doi: 10.2196/17822

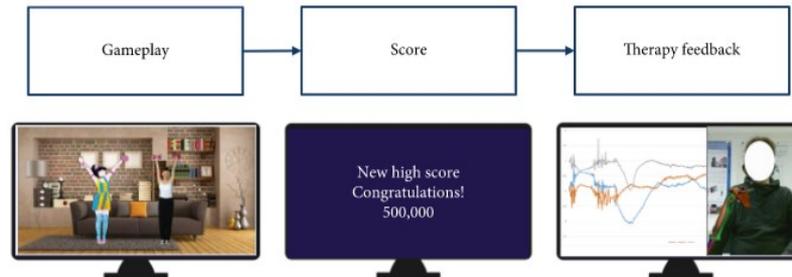
Upbeat: Augmented Reality-Guided Dancing for Prosthetic Rehabilitation of Upper Limb Amputees

In Upbeat, the patient is instructed to follow a virtual dance instructor, performing choreographed dance movements containing hand gestures involved in upper limb rehabilitation therapy.

By gamifying the rehabilitation process, Upbeat has the potential to improve therapy on upper limb amputees by enabling the start of rehabilitation immediately after trauma, providing personalized feedback which professionals can utilize to accurately assess patient's progress, and increasing patient excitement, therefore increasing patient willingness to complete rehabilitation.

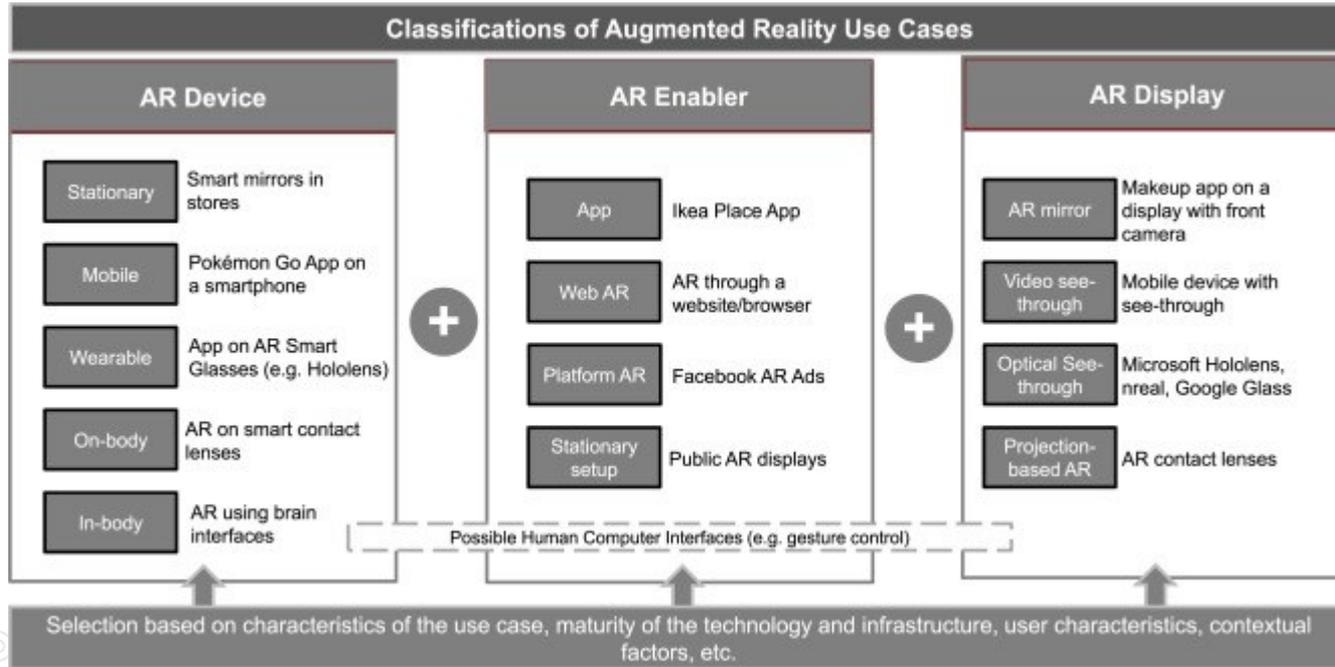


(a)



Melero, et al., (2019). Upbeat: augmented reality-guided dancing for prosthetic rehabilitation of upper limb amputees. *Journal of healthcare engineering*, 2019. <https://doi.org/10.1155/2019/2163705>

Augmented Reality (AR), Virtual Reality (VR), Mixed Reality, and Extended Reality (often – misleadingly – abbreviated as XR) are commonly used terms to describe how technologies generate or modify reality. However, academics and professionals have been inconsistent in their use of these terms.



Rauschnabel, et al., (2022). What is XR? Towards a framework for augmented and virtual reality. *Computers in Human Behavior*, 133, 107289.

Assisted / mixed reality

Assisted Reality ← << low ————— Level of local presence ————— high >> Mixed Reality



head stable content



content is overlaid
(wing should be behind the chair)



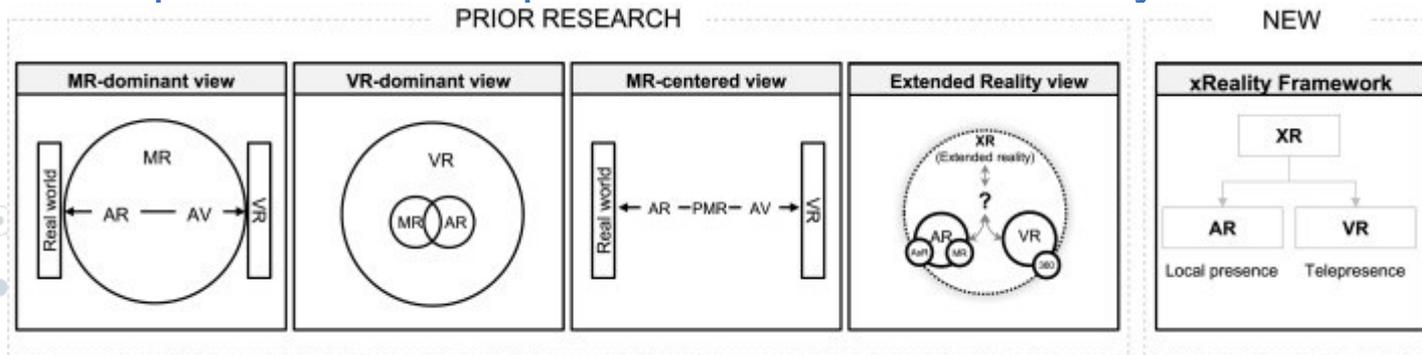
physical chair



content is integrated
and persistent

Rauschnabel, et al., (2022). What is XR?
Towards a framework for augmented and
virtual reality. *Computers in Human
Behavior*, 133, 107289.

Schematic representation of prior “views” on new reality formats



Note: AR = augmented reality; VR = virtual reality; MR = mixed reality; PMR = pure mixed reality; AV = augmented virtuality; AsR = assisted reality; 360 = 360 degree content

Stroke rehabilitation

- In study a virtual reality system was used to provide rehabilitation to stroke patients.
- The system consisted of a computer, a head-mounted display, and a pair of gloves that tracked the movements of the patient's hands.
- The patients were asked to perform different tasks using their hands, such as picking up objects or moving their hands in a certain way.
- The system provided feedback to the patients based on their performance, and the patients were able to see their progress over time.

Virtual reality for stroke rehabilitation

Kate E Laver¹, Stacey George, Susie Thomas, Judith E Deutsch, Maria Crotty

Affiliations + expand

PMID: 25927099 PMID: PMC6465102 DOI: 10.1002/14651858.CD008349.pub3

[Free PMC article](#)

Update in

[Virtual reality for stroke rehabilitation.](#)

Laver KE, Lange B, George S, Deutsch JE, Saposnik G, Crotty M.

Cochrane Database Syst Rev. 2017 Nov 20;11(11):CD008349. doi: 10.1002/14651858.CD008349.pub4.

PMID: 29156493 [Free PMC article](#). [Review](#).



Balance training in elderly patients

- Virtual reality system was used to provide balance training in elderly people.
- The system consisted of a computer, a projector, and a force platform.
- The patients were asked to stand on the force platform while wearing a head-mounted display.
- The system displayed a virtual environment in which the patients had to maintain their balance while walking or standing on different surfaces.
- The system provided feedback to the patients based on their performance, and the patients were able to see their progress over time.

Mirelman A, Rochester L, Maidan I, Del Din S, Alcock L, Nieuwhof F, Rikkert MO, Bloem BR, Pelosin E, Avanzino L, Abbruzzese G, Dockx K, Bekkers E, Giladi N, Nieuwboer A, Hausdorff JM. Addition of a non-immersive virtual reality component to treadmill training to reduce fall risk in older adults (V-TIME): a randomised controlled trial. Lancet. 2016 Sep 17;388(10050):1170-82. doi: 10.1016/S0140-6736(16)31325-3. Epub 2016 Aug 11. PMID: 27524393.

Treadmill training to reduce fall risk

- Study aimed to test the hypothesis that an intervention combining treadmill training with non-immersive virtual reality (VR) to target both cognitive aspects of safe ambulation and mobility would lead to fewer falls than would treadmill training alone.
- Adults aged 60–90 years with a high risk.
- Two programs: 6 weeks of either treadmill training plus VR or treadmill training alone.
- Both groups aimed to train three times per week for 6 weeks, with each session lasting about 45 min and structured training progression individualized to the participant's level of performance.
- In a diverse group of older adults at high risk for falls, treadmill training plus VR led to reduced fall rates compared with treadmill training alone.



ARTICLES | VOLUME 388, ISSUE 10050, P1170-1182, SEPTEMBER 17, 2016

Addition of a non-immersive virtual reality component to treadmill training to reduce fall risk in older adults (V-TIME): a randomised controlled trial

Dr Anat Mirelman, PhD • Prof Lynn Rochester, PhD • Inbal Maidan, PhD • Silvia Del Din, PhD • Lisa Alcock, PhD • Freek Nieuwhof, MS • et al. Show all authors

Published: August 11, 2016 • DOI: [https://doi.org/10.1016/S0140-6736\(16\)31325-3](https://doi.org/10.1016/S0140-6736(16)31325-3) • [Check for updates](#)

Augmented reality technology in Sports Training

Augmented Reality (AR) technology can enhance sports training by providing real-time feedback and guidance to athletes during practices and drills.

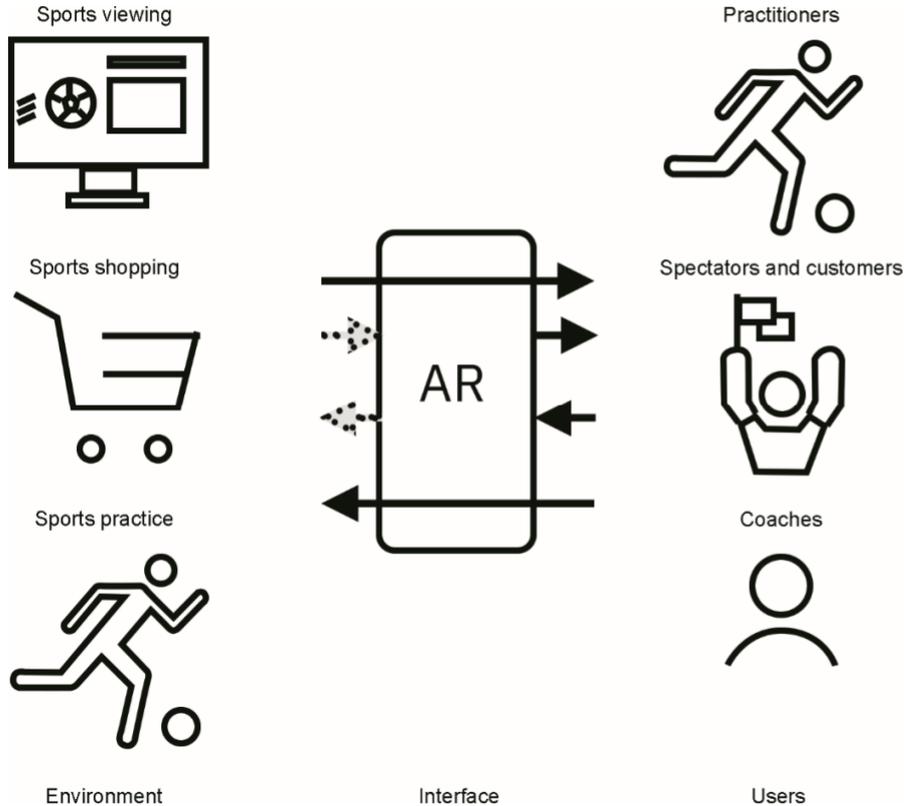
AR can display virtual markers, animations, and simulations, helping to improve athlete performance and understanding of specific techniques.

AR can also track and assess an athlete's progress, providing objective measurements for the coach to adjust the training plan.

AR can also create simulated game scenarios, allowing athletes to practice and improve their decision-making skills in high-pressure situations.

In addition, AR can provide a fun and engaging experience for the athlete, increasing their motivation and overall satisfaction with their training.





Soltani, P., & Morice, A. H. (2020). Augmented reality tools for sports education and training. *Computers & Education*, 155, 103923.

Figure 1: Sketch of using AR systems in sports. Practitioners, coaches, spectators, and 446 customers can take advantage of AR to improve learning, to enhance event watching, and to 447 project themselves into shopping (Soltani, Morice, 2020).

Examples of augmented reality technology used in sports training

Soccer training: Adidas introduced a smart soccer ball called "miCoach Smart Ball" that incorporates AR technology. The ball comes with a companion app that provides instant feedback on how to improve free kicks, penalties, and striking techniques. The study found that the smart ball improved the accuracy of free kicks and increased the motivation of players to practice.

Baseball training: The company Zepp offers a sensor-based training system for baseball players that uses AR technology to provide real-time feedback on swing mechanics, speed, and other performance metrics.

Tennis training: The company Sony developed a smart tennis racket called "Smart Tennis Sensor" that uses AR technology to help players analyze their swings and improve their technique. The study found that the sensor improved the accuracy and consistency of the serve.

a Screen Golf



b Screen baseball



a Yoga



b Dance



Figure 5. Practical physical education in virtual reality.



a Zoom Training



b Cycling



Haake, S., & van der Kamp, J. (2017). Effects of augmented feedback on soccer kick performance and technique. *International Journal of Performance Analysis in Sport*, 17(3), 342-354. <https://doi.org/10.1080/24748668.2017.1368134>

Fadde, P. J., & Knowles, S. B. (2019). Use of sensor technology and augmented feedback to improve baseball swing kinematics. *Journal of Sports Sciences*, 37(8), 900-907. <https://doi.org/10.1080/02640414.2018.1530443>

Chen, S., Lim, S., & Koo, S. (2017). Effect of using the Sony Smart Tennis Sensor on tennis serve performance. *Journal of Sports Sciences*, 35(18), 1786-1791. <https://doi.org/10.1080/02640414.2016.1223916>

Hicheur H, Chauvin A, Cavin V, Fuchslocher J, Tschopp M, Taube W. Augmented-Feedback Training Improves Cognitive Motor Performance of Soccer Players. *Med Sci Sports Exerc.* 2020 Jan;52(1):141-152. doi: 10.1249/MSS.0000000000002118 .



Appropriate smart applications and web platforms in Physiotherapy

🕒 **Physitrack:** A platform that allows physiotherapists to create and prescribe customized exercise programs, track patient progress, and communicate with patients.

The screenshot displays the Physitrack web platform interface. At the top, there are navigation tabs: "Library" (selected), "Exercises", "Templates", "Education", and "Outcome measures". On the right, there are icons for a shopping cart with a "2" and a plus sign.

The left sidebar contains a search bar labeled "Search exercises" and several filter sections:

- Show favourites only
- Specialty: **Neurology**
- Assistance(s): **Assisted**
- Condition(s): **All conditions**
- Movement(s): **All movements**
- Objective(s): **All objectives**
- Position(s): **All positions**
- Region(s): **All regions**
- Equipment: **All equipment**

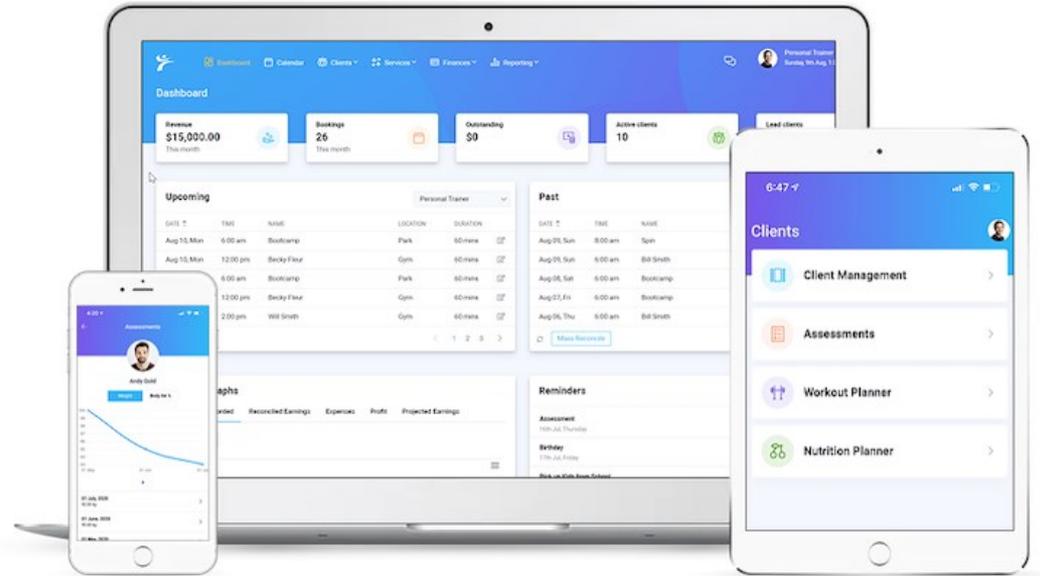
The main area shows a grid of exercise cards. Each card features a thumbnail image, a status icon (checkmark or circle), and text describing the exercise:

- AAROM elbow extension sitting (weight be...)** Upper limb
- AAROM elbow extension supine** Upper limb
- AAROM elbow flexion sitting** Upper limb
- AAROM elbow flexion supine** Upper limb
- AAROM elbow flexion/extension seated** Upper limb
- AAROM shoulder abduction sitting** Shoulder girdle
- AAROM shoulder flexion sitting - long lever** Shoulder girdle
- AAROM shoulder flexion sitting - short l...** Shoulder girdle
- AAROM shoulder flexion sitting - long lever** Shoulder girdle

At the bottom, there is a navigation bar with icons for "Library", "Clients", "Connect", "My account", "Sign out", and a help icon (question mark).

Appropriate smart applications and web platforms in Physiotherapy

- ① **PTminder:** A web-based practice management software that helps physiotherapists manage patient schedules, billing, and other administrative tasks.



Appropriate smart applications and web platforms in Physiotherapy

- ◎ **PhysioTools:** An online platform that provides physiotherapists with access to a wide range of assessment and treatment tools, including exercises and rehabilitation programs.

The screenshot displays the PhysioTools web application interface. At the top, a blue header bar contains the text: "LIBRARY PAGE Saunders Therapy Provider: Robin Saunders, MS PT 04/12/96 English". Below the header, there are several panels:

- Physiother.:** Saunders Basic, 003.002.008, 32
- LIBRARY:** All, Physiotherapy, User defined
- COLLECTION:** All, Saunders Basic, Paediatrics
- SORT 1:** All, Face, Jaw, Neck, Scapula, Shoulder, Elbow, Wrist, Fingers, Thumb, Upper Trunk, Lower Trunk, Pelvis, Hip, Knee, Patella, Ankle, Toes, Cardiovascular, Whole Body, Misc.
- SORT 2:** All, Flexion, Lat.Flex., Ext., Rot., Retraction, Autotrraction
- SORT 3:** All, Mobilizing, Strengthening, Stretching

The main content area is a grid of 12 exercise illustrations, each with a label below it:

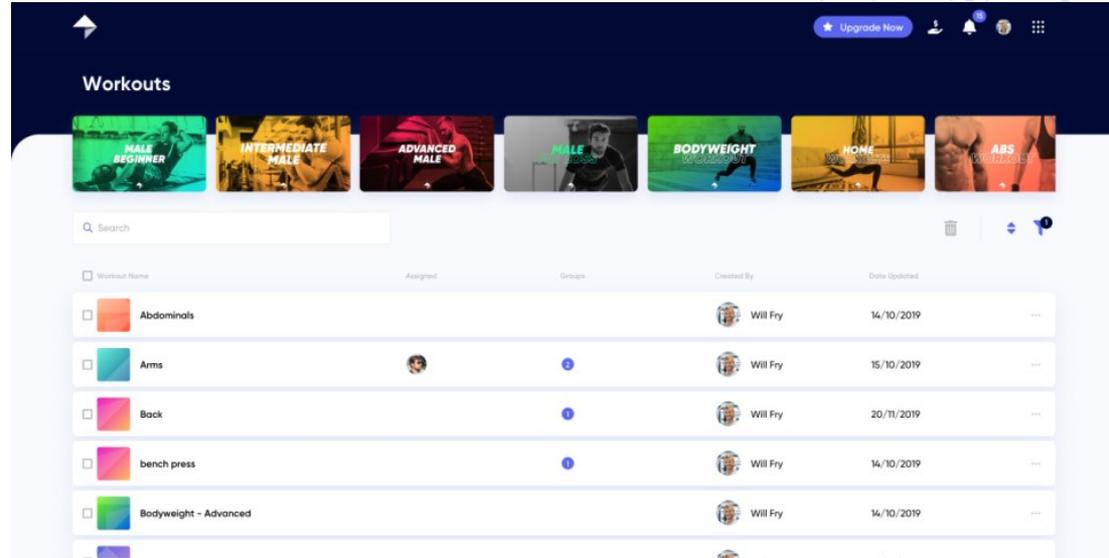
- Misc.
- Axial Extension
- Axial Extension
- Axial Extension
- Neck Extension
- Neck Extension
- Neck Extension
- Neck Flexion
- Neck Flexion
- Neck Flexion
- Neck Flexion
- Neck Rotation
- Neck Rotation
- Neck Sidebending
- Neck Sidebending
- Suboccipital Release

On the right side, there are navigation and control buttons: "Exit", "Show text", "PgUp", "PgDn", "ON", "Search", "Clear", "Preview", "Print", "01.03.02", and "Edit".



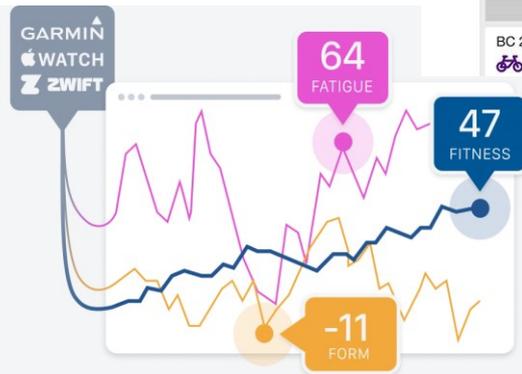
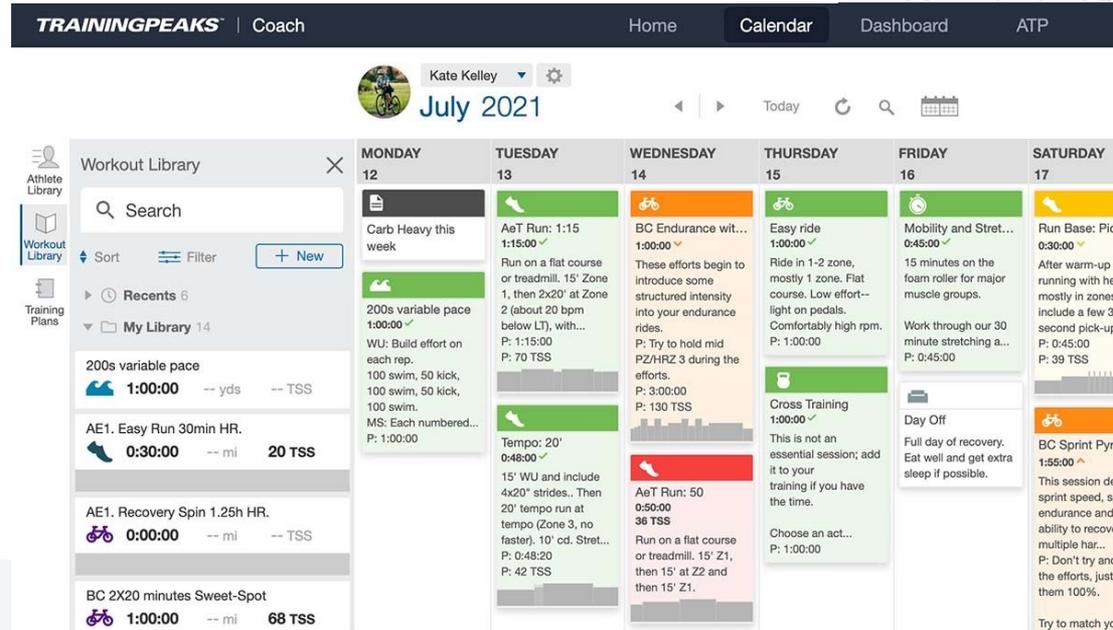
Appropriate smart applications and web platforms in Physiotherapy

🕒 **MyPT Hub:** An app that connects patients with physiotherapists, allowing them to schedule appointments, receive virtual treatment, and track their progress.



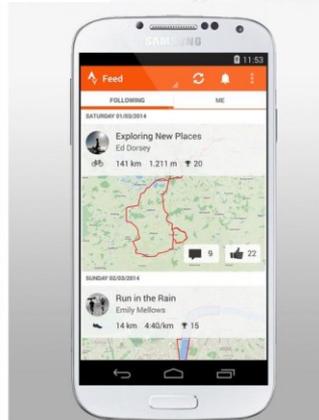
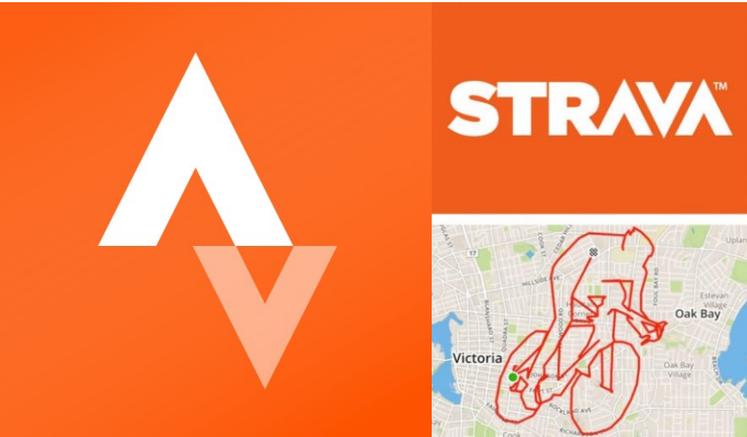
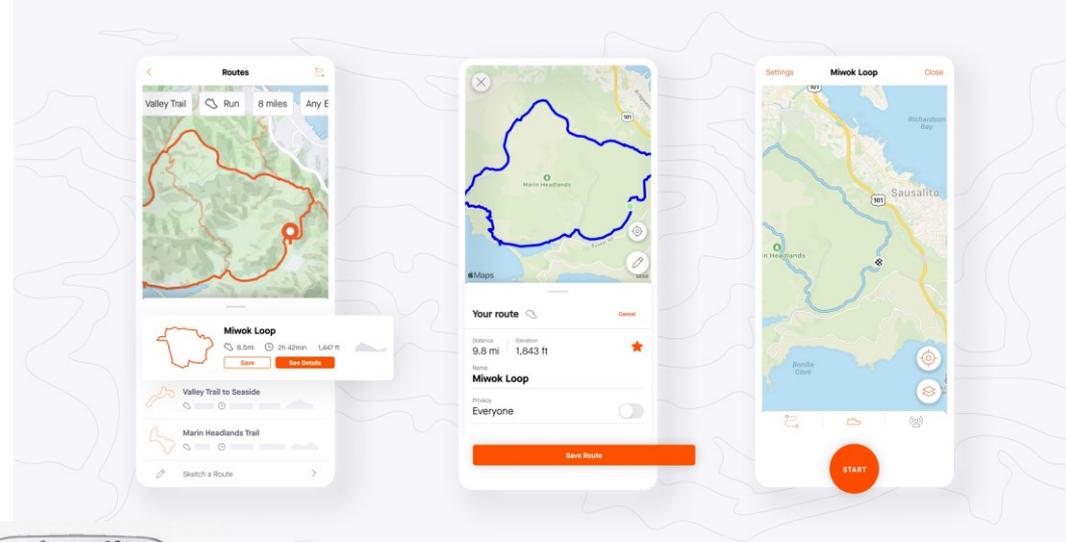
Appropriate smart applications and web platforms in Physiotherapy

TrainingPeaks: A web-based platform that provides coaches and athletes with tools for tracking workouts, analyzing performance, and setting training goals.



Appropriate smart applications and web platforms in Physiotherapy

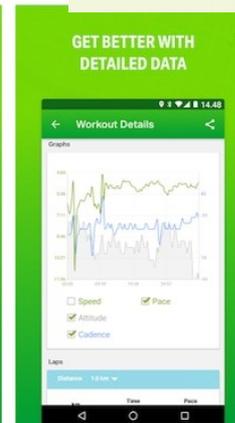
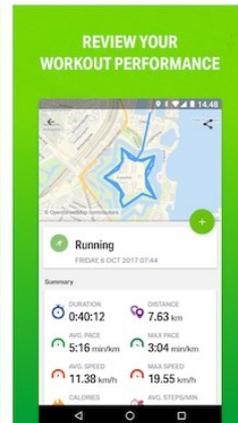
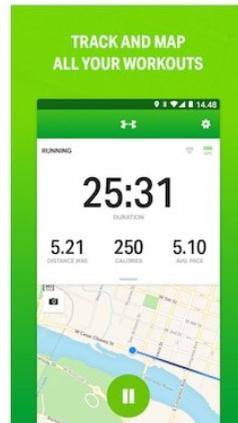
- 🕒 **Strava:** A social network for athletes that allows users to track their activities, set personal records, and compare their performance with others.



Appropriate smart applications and web platforms in Physiotherapy

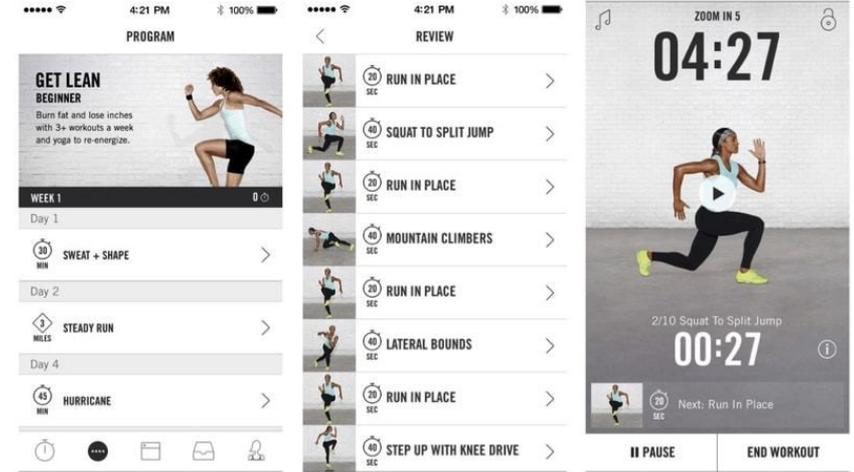
- Endomondo: A sports tracking app that allows users to track their workouts, set goals, and compete with friends.

endomondo
FREE YOUR ENDORPHINS



Appropriate smart applications and web platforms in Physiotherapy

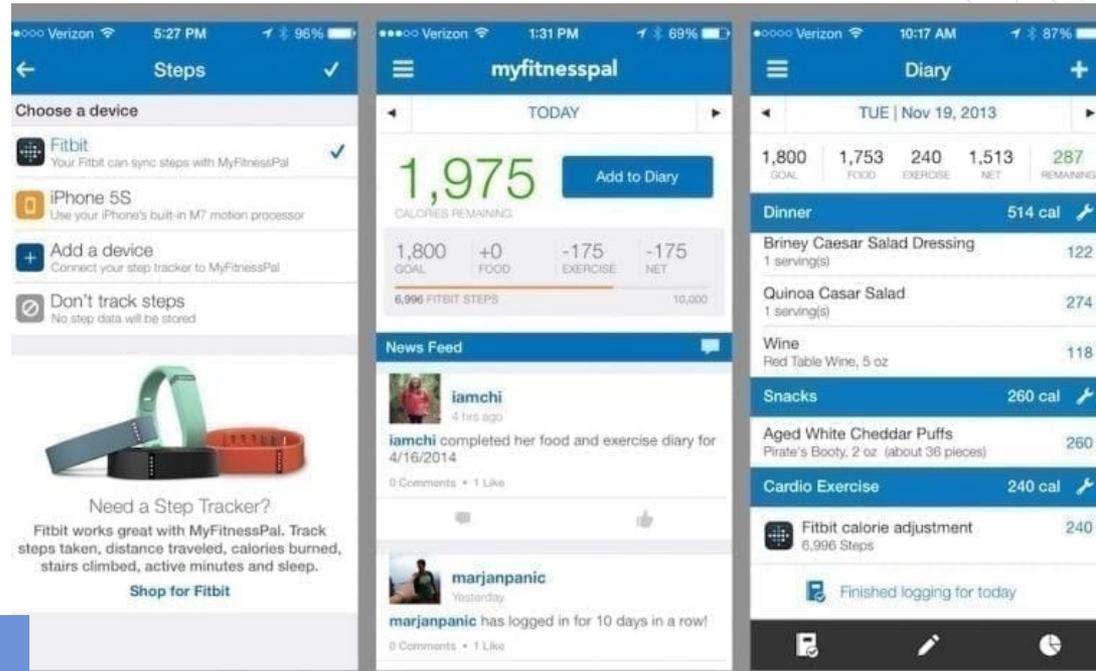
🕒 **Nike Training Club:** A fitness app that provides users with personalized workout plans, video demonstrations of exercises, and the ability to track their progress.



Adamakis, Manolis. (2017). Nike+ Training Club, an ultimate personal trainer: mobile app user guide. *British Journal of Sports Medicine*. Online first. [10.1136/bjsports-2017-098414](https://doi.org/10.1136/bjsports-2017-098414).

Appropriate smart applications and web platforms in Physiotherapy

MyFitnessPal: A diet and exercise tracking app that helps users monitor their food intake and physical activity levels.





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Module 3

How to train your clients in digital performance



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Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

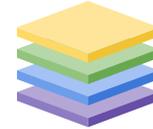
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and Evaluation
P23

Glossary of terms:

Term / Concept	Definition	Reference
Telehealth	A term under the digital practice umbrella, which encompasses health care services, support, and information provided remotely via telecommunication technology	World Confederation for Physical Therapy. https://world.physio/sites/default/files/2020-06/WCPT-INPTRA-Digital-Physical-Therapy-Practice-Task-force-March2020.pdf
Consultation	A consultation is a conference or meeting where opinions are exchanged, or advice is prescribed.	Vocabulary Dictionary https://www.vocabulary.com/dictionary/consultation
Broadband	A telecommunication that provides multiple channels of data over a single communications medium using frequency multiplexing- the term can refer more generically to a higher bandwidth that will support real-time, full motion audio and videoconferencing.	Australian physio – telehealth guide https://australian.physio/
Video conferencing	Connection of two or more people or locations via video camera and monitors, allowing all parties to speak to each other, see each other and in some cases exchange data simultaneously.	Australian physio – telehealth guide https://australian.physio/

Introduction

The Evolution of Digital Technology in Physiotherapy

The use of online digital technologies and virtual environments have increased in the last number of years. This has also become more frequent in the areas of physiotherapy and movement care. Using digital technology to communicate and deliver healthcare information remotely is known as **telehealth**. Following the period of Covid-19, this concept has been reborn, providing professionals with the ability to continue manage patients with chronic conditions and ensuring access to healthcare services.



The aim of this module is to alleviate ‘digital exclusion’ and inequalities in patients accessing this care through improving digital skills and guidance for both practitioners and patients.

Objectives:

- To assess digital capabilities of physiotherapists and their clients
- To equip physiotherapist with the skills to use digital technologies in their practices

Learning Outcomes

On completion of this module the learner will be able to:

- ① **LO1** – Carry out a client evaluation using digital online tools to screen movement and performance
- ② **LO2** – Upskill clients competence in using digital platforms to assess their movement plan
- ③ **LO3** – Conduct online feedback sessions before and after the evaluation and create a movement plan

Keywords

- ◎ Evaluation; Online; Digitalisation; Resources; Communication.

Estimated seat time

- ◎ To complete the module, you will have to spend approximately **3 hours**

Unit 1 Digitilisation - Transforming Evaluation

In Person - Evaluation

In person face-to-face and physical therapy was once the only form of **communication** and connection between a therapist/ trainer and their client.

- ⦿ A practice wiped out due to social distancing imposed by the COVID-19 pandemic forced a digital transformation revolution that now benefits clients and practitioners.
- ⦿ **Digital transformation** to online platforms provides health solutions using Telehealth teleconferencing platforms and plays a role in:
 - Objective evaluation,
 - Exercise prescription,
 - Providing advice.



Digitilisation - Online Evaluation – What to Expect?

With an **online evaluation session**, you connect with a physiotherapist/ trainer professional via digital video conferencing technologies from your home environment. They will assist;

- 1) Diagnose your injury
- 2) Decide your treatment goals
- 3) Customise a treatment plan to achieve movement goals

- **Video conferencing (live video):** is a real-time interaction using online platforms that support video and audio communication between the therapist and client (or clients) in a 1 on 1 or group-type sessions. Video conferencing can be carried out via Skype, Zoom, Microsoft Teams, Google Meet, WhatsApp etc. online platforms.

Digitilisation - Why choose an Online Video

Consultation?

- ◎ An online evaluation with an expert physiotherapist and/or trainer is a quick and easy option for most issues.
- ◎ It can help:
 - those looking to progress on a current rehab plan,
 - assist with new “posture pain” as result of working-from-home desk ergonomics,
 - support you in the rehabilitation of a new injury.

With novel **advancements in digital technology**, online physiotherapy has become an **efficient treatment** for common musculoskeletal symptoms that self-help models and advice can manage without necessarily requiring face-to-face treatment.

Digitilisation – Video Consultations

What can they achieve?

- ① Provide physiotherapists and/or trainers the ability to support clients online in a virtual environment
- ① Requires no travel
- ① Suitable for almost every type of ache and pain!
- ① Any musculoskeletal (MSK) conditions can be assessed including but not limited to;
 - Back pain/stiffness
 - Neck pain/stiffness
 - Shoulder/Elbow/Wrist pain/stiffness
 - Hip/Knee/Ankle/Foot pain or stiffness
 - Sports Injuries
 - Posture Problems
 - Sciatica/Nerve Pain
 - Rheumatological Conditions (e.g., Arthritis)



Unit 2: Transition – Digital Technologies (Telehealth) in your practice

As a physiotherapist/ training professional consider:

1. **Your physical professional set-up** – Environment, connectivity, location and privacy
2. **Your online tools needs** - Technology to enable online consultations
3. **Client screening and call set-up** - online questionnaire (Google forms, Microsoft forms etc.) and Virtual consultation scheduling ([Calendly](#), [Powerdiary](#) etc.)
4. **Your telehealth code of conduct** – step by step therapist and client online communication protocol.

Practitioner

A therapist will always aim to ensure that your video consultations feel personal to your client.



How to Prepare – Digital Considerations



As a therapist, consider the following to create a personal experience for your client:

1. Your initial greeting – use a **‘virtual handshake’**
 - **How?** Raise your hand in the air and wave!
2. Your introduction – **make eye contact** with the camera/ the client when introducing yourself
 - **Why?** This will help to strengthen your client's online relationship.
3. Communication flow - speak clearly and give time for your client to reply
 - **Why?** Audio delays occur. Pacing cues such as gestures are helpful for this.
4. Summarise consultation at the end – into **key action points**
 - **Why?** To inspire the client to ask questions that may be difficult to ask during their consultation.
5. **Look professional** – be presentable and wear professional attire
6. Use a **plain background** with adequate front lighting
7. **Position** yourself comfortably – sit upright with **good posture**, be **centered** on the screen, and always **maintain a 2 feet (60 cm) distance** away from the camera
 - **Why?** To maintain professionalism and prevent camera and screen focus issues

How to Prepare – Practitioner 101

Considerations to prevent a technology negatively impacting a client's online consultation:

1. **Your device** - laptop, tablet or smartphone, with a **camera, microphone** and **speaker**
2. **Check your tech** to ensure:
 - ☑ your **camera** and **microphone** are **enabled** on your device
 - ☑ your device is **fully charged**/ has power
 - ☑ your **microphone** and **speakers** (using a headset will improve audio quality)
 - ☑ your **camera** is **clear** and has **picture**
3. **Consultation software** (Skype, Zoom, Microsoft Teams, Google Meet, WhatsApp etc.) must be reviewed with respect to each client's unique need and user-friendly. A set up and user guide should be sent to each client.
 - **Ensure** your guide is clear and logical, providing essential information on how they can access the consult with a link sent via email, text or both.



How to Prepare – Practitioner 101



4. **Internet connection** – Ensure your connection is stable with a:
 - **Download speed** - aim for a connection with a minimum of **50Mbps** to allow real-time viewing with **minimum to no buffering** at **720p**.
 - **Broadband types**
 - ☉ **Wired broadband connection** will give you the **fastest** connection speed.
 - ☉ **Mobile internet and WiFi** are **slower** and suffer due to environmental barriers such as walls and multiple users.
 - ☉ **Hotspot** - Keep a phone nearby to enable communication in case of any interruptions during the session.

5. **Screen sharing functioning:** will allow you to present material (pre-prepared photos or videos) to show clients how to perform exercises and test in their remote environment.

6. **Draw up a contingency plan:** specific to your consultation and client needs to mitigate against the potential risk of technical failure.
 - **Ensure to communicate and agree** on a **contingency plan** at the start of the **consultation** with your **client** to mitigate issues – i.e., changing to an audio consultation via telephone due to connection difficulties.

Pre-Consultation - Practitioner 101

Consent - Your client must fully understand what their online consultation will involve and decide for themselves whether it is the appropriate healthcare delivery method for them. Your client must receive pre-consultation consent information before every session, which should include the following:

- ⦿ the practicalities of their consultation,
- ⦿ device requirements (laptop or tablet rather than a desktop computer or phone),
- ⦿ login details,
- ⦿ lighting (directed towards the patient, not the camera),
- ⦿ location (quiet and safe for examination)
- ⦿ clothing (allowing joint visualisation without exposure to intimate areas).

It is important to remind each client that they are free to withdraw from the session whenever possible and must grant consent via written and verbal record.



What to expect as a client?

⦿ **During your appointment – online evaluation:**

- you can speak to your physiotherapist about your injury;
- answer detailed questions about how you feel;
- set goals for your treatment needs;
- the online setting will provide your physiotherapist will get an "inside look" into your environment at home to assess your workstation, home gym, footwear, etc., which may help uncover the cause of your pain
- your physiotherapist will be able to assess your mobility as they would if you were in the office.

⦿ **After your online evaluation, your physiotherapist will:**

- collate your information to accurately diagnose your injury,
- design a customised rehabilitation plan focused on your goals and move pain free.

⦿ **Your rehabilitation plan may include:**

- mobility stretches
- strengthening exercises,
- soft tissue release exercises using a foam roller or lacrosse ball.

Unit 3 – How to engage the client?

Tips to remind clients to better engage with digital practice:

1. What type of device should I use?

- Laptop, phone or tablet device with a functioning camera and microphone turned on.
- Please **ensure** your laptop/ device is fully charged

2. Will I need software to join my consultation?

- Following booking confirmation with the therapist, you will receive a meeting information and invite link via email before your appointment.
- This will inform you of what you need for the consult and if you need to download software on your device (Skype, Zoom, Microsoft Teams, Google Meet or WhatsApp etc.).

***Ensure to set up and tested prior to online session.**



Unit 3 – How to engage the client?

A client should consider the following:

- ✔ Setting up in a **quiet area** of your house/office with a **good Wi-Fi** connection;
- ✔ Having an **exercise mat** or **towel** in case you need to lie on the floor to assess joint movements;
- ✔ Having **additional equipment** that you may need, including - foam roller, resistance bands or weights that you use;
- ✔ Having **enough space to move around** so the physiotherapist will be able to run through a movement evaluation.



Unit 3 – How to engage the client?

3. What should the client wear for an online consultation?

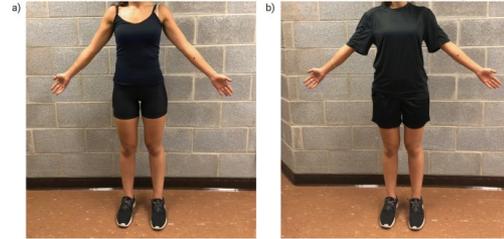
Comfortable clothing, for example shorts and a t-shirt.

Why? to allow your physiotherapist accurately assess your condition.

Considerations:

- ✔ If your pain is in your back or neck - you may need to remove your t-shirt, therefore females **should** wear a sports bra
- ✔ If you have a shoulder or arm injury – you may need to remove your t-shirt, therefore females **should** wear a sports bra
- ✔ If you have a hip or leg injury – wear shorts so that your physiotherapist/trainer can see the affected area.

Note – you may need to take your t-shirt off if they suspect that your pain is referred from your lower back.



Unit 3 – How to engage the client?

4. Be ready 10 minutes before your consultation

Ensure:

- ✔ Your device, camera and connection are all working;
- ✔ You have connection to the internet and that it is working;
- ✔ You have list of questions or queries ready.

Its easy to set up but give yourself time incase there are any issues.

This will save you stress and allow you to get the most out of your time with your physiotherapist/ trainer.



Unit 4 - Feedback and Evaluation following a video consultation

After the consultation as the practitioner:

- ✔ **Summarise** the consultation at the end with your client – into **clear action points**;
- ✔ **Update** your **client records, schedule** follow up appointments and referrals with clients;
- ✔ **Send** your client a prompt follow up email;
- ✔ **Send** client plans and any exercises you have prescribed/promised – **promptly**.

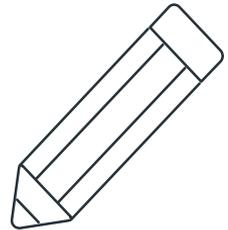
Look for client feedback - to ask the client to evaluate their experience to ensure it aligns with their expectations. An evaluation should be focused, short and repeated regularly in line with your client's progress.

Feedback and Evaluation – following a video consultation

You, as the practitioner, will determine the structure of evaluation based on the clients needs and consultation.

Some questions to consider:

1. Were you able to see and hear the physiotherapist throughout the consultation?
2. Were there any drop-outs in the connection, blurriness of the image, or muffled sound at your end?
3. Did you receive the care and information you required?
4. Would you be willing to have another consultation using the same technologies in the future? If not, what could be done to improve the service?





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Overall Assessment

Choose the correct answer (only **one** option is correct):

1. Using digital technology to communicate and deliver healthcare is known as?
 - a) television;
 - b) telehealth;**
 - c) teleportation.
2. What is a main goal for practitioners to ensure when performing online consultations?
 - a) ensure the experience feels personal for my client;**
 - b) ensure the experience feels uncomfortable for my client;
 - c) ensure the experience hurts my client.

Overall Assessment

Determine if the sentence is **true or false**.

- | | | |
|--|------|-------|
| 1. The <i>internet</i> is not suitable for online video consultations. | True | False |
| 2. A <i>mic</i> and <i>camera</i> are essential for online video consultation. | True | False |
| 3. Client <i>consent</i> is not important for an online video consultation. | True | False |
| 4. Professionalism is only important for an in-person consultation. | True | False |

Fill in the gaps with the **missing** words

Summarise the consultation at the end with your client – into clear action points;

An evaluation should be focused, short and repeated regularly in line with the client's progress.



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Module 3

*How to train your clients in digital performance
Case Studies & Resources*



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Case Study - Irish Life Virtual Physiotherapy



Who are Irish Life?

Irish Life is a private healthcare company in Ireland. They run a virtual 'MyClinic' where all their members get unlimited virtual physiotherapy consultations at no extra cost.

- From posture problems to sports sprains, and back pains to wrist strains, expert physiotherapists are on hand to help diagnose the issue and get you back on track.
- Clients get fast access to expert physio advice at their own time, place and convenience with a member where they book each virtual/ online appointment.

Why does Irish Life Virtual Physiotherapy work well?

- Clients do not need a GP for a referral.
- All the Physios are registered with CORU and the Irish Society of Chartered Physiotherapists and are experienced in using digital technologies for to assessing if an injury requires face-to-face investigation.
- The platform provides clients with clear detail FAQ specific to the client's set-up requirements (device, location and clothing etc.).

Link: <https://www.irishlifehealth.ie/benefits/myclinic/virtual-physio>

Case Study - MOVE SMART MS



Who are MS Ireland?

The MS Care Centre are a dedicated respite centre for people with Multiple Sclerosis in Ireland, providing information, vital services and support to the MS community.

What is MoveSmart MS?

MoveSmart MS is MS Ireland's online, nationally recruited, symptom-focused exercise program. MoveSmart offer specialised, tailored, symptom-specific online exercise programmes in blocks for people living with MS, grouped by age and stage in their MS journey.

MoveSmart – why it works

- MS Ireland learned that by moving physiotherapy and exercise programmes online, transport, travel time, and accessibility barriers are removed.

MoveSmart programmes:

- are evidence-based and developed with the latest research to shape their content.
- include exercise and an education component to help participants to meet their goals. Participants are grouped with others of a similar age and stage of MS and mobility level.

Link: <https://www.ms-society.ie/move-smart-ms>

Case Study – CSP Digital physiotherapy

Who are Chartered Society of Physiotherapy (CSP)?

The Chartered Society of Physiotherapy (CSP) is the professional, educational and trade union body for the UK's 64,000 chartered physiotherapists, physiotherapy students and support workers.

CSP has gathered the case studies of their members to showcase digital solutions and highlight the challenges, solutions, and benefits of using digital tools during remote physiotherapy delivery.

Link: <https://www.csp.org.uk/professional-clinical/professional-guidance/remote-consultations/digital-physiotherapy-case-studies>



Resources for Further Reading

- ◎ **Telehealth Toolbox (2020)** – Simple videocall software that are free of charge and provide a range of capabilities to meet your video consultation needs. Link - <https://telehealthtoolbox.netlify.app/guidelinesdetail>
- ◎ **Video conferencing platforms** - Top 5 Video Conferencing Apps in 2023 Explained - Zoom/ Microsoft teams/ Google meet/ Skype – YouTube video. Link - <https://youtu.be/lji3wkMn5YM>
- ◎ **Health & Social Care Professions: Telehealth Toolkit** - developed to provide practical guidance and assistance to health and social care professionals as they work to redesign services with an eye to the future of health care provision. Link - <https://www.iasw.ie/download/871/HSCP-Telehealth-Toolkit-2021.pdf>

Resources for Further Reading

- ◎ **Remote consultations professional guidance** – The Chartered Society of Physiotherapy (CSP) is the professional, educational and trade union body that provide free guidance and resources to practitioners on remote consultations. Link - <https://www.csp.org.uk/professional-clinical/professional-guidance/remote-consultations>
- ◎ **Communication tips** - article by Roberts & Osborn-Jenkins (2021) includes detailed guidance for practitioners on effective communication in remote consultations. Roberts, L. C., & Osborn-Jenkins, L. (2021). Delivering remote consultations: talking the talk. *Musculoskeletal Science and Practice*, 52, 102275. DOI: org/10.1016/j.msksp.2020.102275.
- ◎ Guide to adopting remote consultations in adult musculoskeletal physiotherapy services. Link - <https://www.england.nhs.uk/long-read/guide-to-adopting-remote-consultations-in-adult-musculoskeletal-physiotherapy-services/>



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Module 4
Accessibility for people with disabilities



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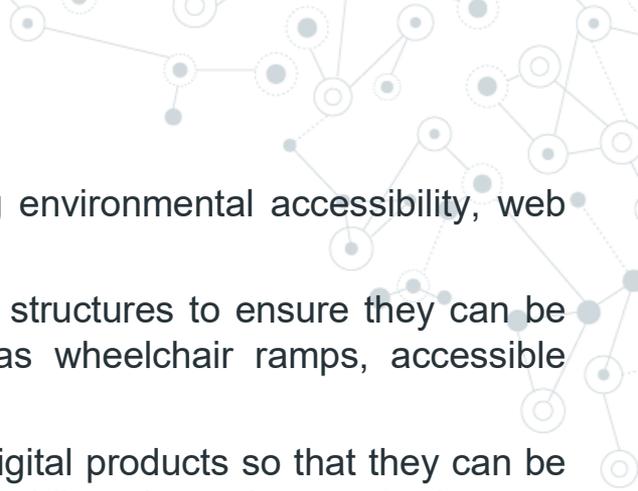


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Glossary of terms:

Term / Concept	Definition	Reference
AIS – Accessible information standard	All services and carers are provided with information that they can access and understand, so they can be supported to communicate effectively.	Accessible Information Standard. (n.d.). https://www.beh-mht.nhs.uk/accessible-information-standard.htm
Disability	A physical, mental, cognitive, or developmental condition that impairs, interferes with or limits a person's ability to engage in certain tasks or actions or participate in typical daily activities and interactions.	Merriam-Webster Dictionary https://www.merriam-webster.com/dictionary/disability

INTRODUCTION



In this module, we will cover various aspects of accessibility, including environmental accessibility, web accessibility, equity, and tools to evaluate accessibility.

Environmental accessibility refers to the design of physical spaces and structures to ensure they can be used by people with disabilities. This includes considerations such as wheelchair ramps, accessible doorways, and accessible bathrooms.

Web accessibility, on the other hand, involves designing websites and digital products so that they can be used by people with disabilities. This includes considerations such as providing alternative text for images, captioning videos, and ensuring that website navigation is keyboard accessible.

Equity is an important aspect of accessibility, as it ensures that people have access to the same opportunities, regardless of their disability status. This includes providing accommodations in the workplace or educational settings. Finally, we will explore various tools to evaluate accessibility, including automated testing tools and manual evaluation methods.

At the end of this module, you will have a better understanding of accessibility and its importance, as well as practical knowledge of how to make spaces, products, and technology more accessible for people with disabilities.



Learning Outcomes



After finishing this module the learner will be able to:

- ① Understand the meaning of accessibility for its patients/ clients;
- ② Understand how accessibility relates to equity;
- ③ Understand the criteria necessary to make its services accessible



Keywords

- ⦿ Accessibility; Disability; Information; Resources; Equity.

Estimated seat time

- ⦿ To complete the module, you will have to spend approximately 3 hours

Unit 1. Accessibility

Meaning

Accessibility is the practice of making information, activities, and/or environments sensible, meaningful, and usable for as many people as possible.

– seewritehear.com



Source: Seach Engine Journal



Source: Minnesota Council On Disability

Accessibility can be adapted to many people according to their needs. When we envision the word “Accessibility”, the first thing that comes to mind is, for the majority of people, disability. Disability comes in many ways, either being externally seen or not:

Accessibility can be seen as creating a “barrier-free” environment, where we need to pay attention to both urban and architectural design considerations. **But what are the differences between these two?**

URBAN:

- The urban design considerations are associated with outside spaces, such as road obstructions, zebra crosses, street furniture, and pathways.



Source: FreePick

ARCHITECTURAL:

- The architectural design consideration includes ramps, elevators, stairs, doors and corridors.



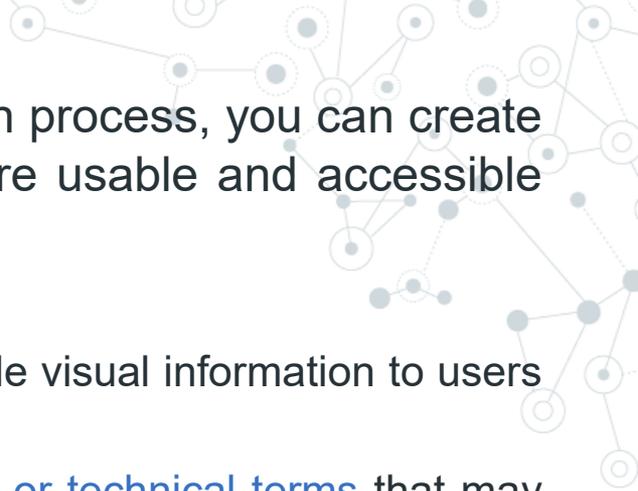
Source: FreePick

Key concepts to consider when designing for accessibility

- ① **Perceivable:** Information and user interface components must be presentable to users in ways they can perceive, whether it's through vision, hearing, touch, or other senses.
- ① **Operable:** User interface components and navigation must be operable, meaning that users can interact with them easily and efficiently.
- ① **Understandable:** Information and the operation of user interface must be understandable to users, including those with cognitive or learning disabilities.
- ① **Robust:** Content must be robust enough that it can be interpreted reliably by a wide range of user agents, including assistive technologies.



Source: Uxcel

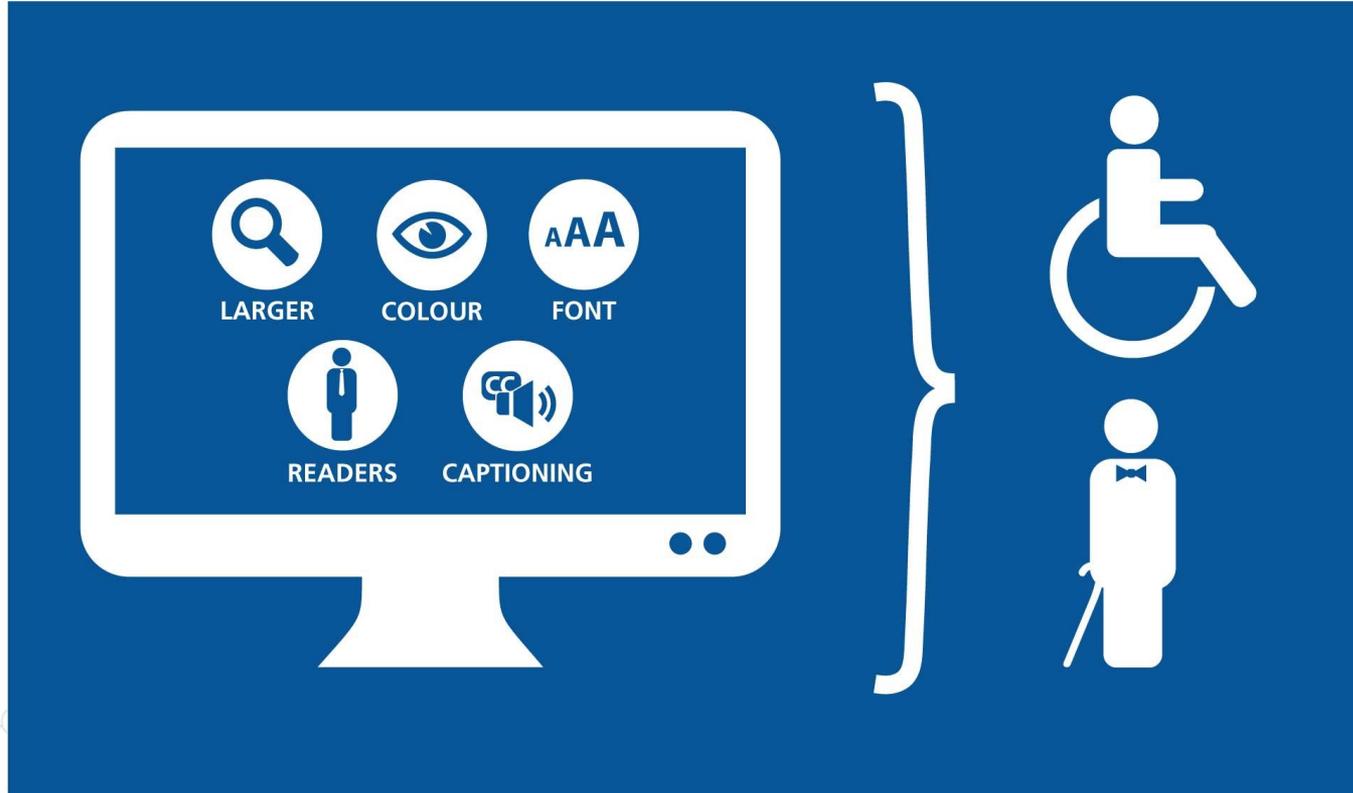


By considering accessibility from the start of the design process, you can create products, devices, services, and environments that are usable and accessible to the greatest possible number of people:

- ① Providing **alternative text** for images and videos to provide visual information to users who are blind or have low vision.
- ① Use **clear and simple language**, and **avoid using jargon or technical terms** that may be difficult for users with cognitive disabilities to understand.
- ① Designing **user interfaces** that are easy to navigate using keyboard-only controls, rather than relying solely on a mouse, to accommodate users with motor disabilities.
- ① Ensuring that **colour is not used as the sole means of conveying information** or indicating an action, as some users with colour blindness may not be able to perceive it.



Accessibility can also come in form of access to information available online.



Source: Training9

Web accessibility:

Web accessibility allows people with disabilities to use websites, tools and technologies that are designed and developed for them. These accessibility features can also be used by non-disabled people, for example, when needing to watch a video without sound, adapting to changes of old age and temporary impediments such as broken bones or lost glasses.

This proves that accessibility is, not only important for people with lifelong disabilities, but also to general people in day-to-day contexts.



Web accessibility is required by law in the majority of European countries!

Unit 2. Evaluation of accessibility

Topics to evaluate web-accessibility

To guarantee that the web has all its features accessible to people with disability, it is necessary to test all of its features and functionalities. For that, you can use many tools and criteria available online.

1. Initial check;
2. Available tools;
3. Conformance evaluation and reports;
4. Involving people;
5. Expert's input.



Source: W3C

1. Initial check

For an initial check of the accessibility of a website, you can start by [performing the following](#) simple tests:

- ⦿ Navigate through the website using [only the keyboard with the TAB button, space, enter and the arrows](#) to check if you can access all the content and functionality without using a mouse.
- ⦿ Check the colour contrast of text on the website to make sure it is legible for users with visual impairments. You can use an [online colour contrast tool](#) for this.
- ⦿ Ensure that [alternative text](#) has been provided for images, videos, and other non-text content. This can be checked by looking at the HTML code or by using a screen reader.
- ⦿ Look for [clear and descriptive headings and labels](#) to help users with cognitive disabilities understand the structure of the content.
- ⦿ Test the website with a [screen reader](#) to see if the content is readable and understandable to users with visual impairments.

These tests are a good starting point for an initial accessibility check, but they should not be considered a comprehensive evaluation. For a more thorough evaluation, you may want to consider conducting user testing with people with disabilities and using specialized accessibility testing tools and techniques.

2. Available Tools

There are several tools available to help with evaluating the accessibility of a website:

- ① [Accessibility checkers](#): Automated tools that scan your website's HTML code and check for common accessibility issues, such as missing alternative text for images or poor colour contrast. Examples of accessibility checkers include the WAVE accessibility tool, the Accessibility Checker for Microsoft Edge, and the accessibility checker in Chrome DevTools.
- ① [Screen readers](#): Software that reads the content of a website out loud to users with visual impairments. Examples of screen readers include NVDA, JAWS, and VoiceOver.
- ① [Color contrast analyzers](#): Tools that analyze the colour contrast of text and background on a website and indicate whether it meets the accessibility guidelines. Examples of colour contrast analyzers include the Color Contrast Analyzer and the Contrast Checker.
- ① [Automated testing tools](#): Tools that can automate the process of testing the accessibility of a website, saving time and resources compared to manual testing. Examples of automated testing tools include Accessibility Insights for Web, Tenon.io, and pa11y.
- ① [User testing](#): Engaging users with disabilities to test the accessibility of a website and provide feedback on their experiences. This type of testing can provide valuable insights into the accessibility of a website and help identify areas for improvement.

It is important to note that no single tool or method can guarantee accessibility, and a combination of techniques is often necessary to get a comprehensive understanding of a website's accessibility.

3. Conformance evaluation and reports

Conformance evaluation and reports are a [way to determine if a website meets the accessibility standards and guidelines](#), such as the Web Content Accessibility Guidelines (WCAG) 2.1. The evaluation process typically involves [using a combination of manual testing, automated tools, and user testing](#) to assess the accessibility of a website. The results of the evaluation are documented in a conformance report, providing an overview of the web accessibility of our tools and recommending improvements in the identified issues.

Conformance reports can be useful for:

- ① [Providing evidence of a website's accessibility](#) compliance for stakeholders, such as users with disabilities, government agencies, and customers.
- ② [Identifying areas for improvement](#) and helping prioritize accessibility efforts.
- ③ Facilitating the [development of an accessibility policy](#) and ensuring that all web content is accessible to all users.

It is important to note that conformance evaluations and reports should be [conducted regularly](#) to ensure that websites remain accessible as they are updated and maintained over time.

4. Involving people

Involving people, especially those with disabilities, in the accessibility evaluation process is a significant step towards ensuring that websites are accessible to all users. This process ensures the web tool is accessible to all users and meets their needs and expectations. It can also provide valuable insights and ideas for improving accessibility and creating a more inclusive digital environment.

There are several ways to involve people in the evaluation process:

1. User testing: Engaging users with disabilities to test the accessibility of a website and provide feedback on their experiences. User testing can provide valuable insights into the accessibility of a website and help identify areas for improvement.
2. User feedback: Encouraging users with disabilities to provide feedback on the accessibility of a website, such as through feedback forms or a dedicated email address. This can help identify any accessibility issues that may not have been discovered through other methods.
3. Accessibility community involvement: Engaging with accessibility organizations, user groups, and other community organizations to gather feedback and suggestions for improving the accessibility of a website.

5. Expert's input

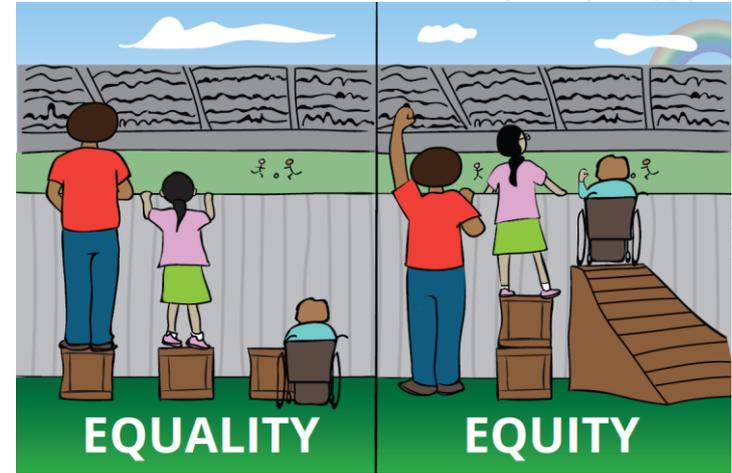
The input of accessibility experts is valuable in ensuring that a web tool is accessible to all users. Accessibility experts have a deep understanding of accessibility guidelines and best practices and can provide valuable insights and recommendations for improving the accessibility of a website. There are several ways to involve accessibility experts in the evaluation process:

1. [Accessibility audits](#): Hiring an accessibility consultant to conduct a comprehensive accessibility audit of the website. The consultant will use a combination of manual testing, automated tools, and user testing to evaluate the accessibility of the website and provide recommendations for improvement.
2. [Expert review](#): Inviting an accessibility expert to review the website and provide feedback on its accessibility. This can be a cost-effective alternative to a full accessibility audit and can provide valuable insights and recommendations for improvement.
3. [Accessibility working groups](#): Engaging accessibility experts in a working group to evaluate the accessibility of a website and provide recommendations for improvement. This can be a collaborative and cost-effective approach to accessibility evaluation, and can also help build internal expertise and understanding of accessibility issues.

Unit 3. Equity

Equity through accessibility

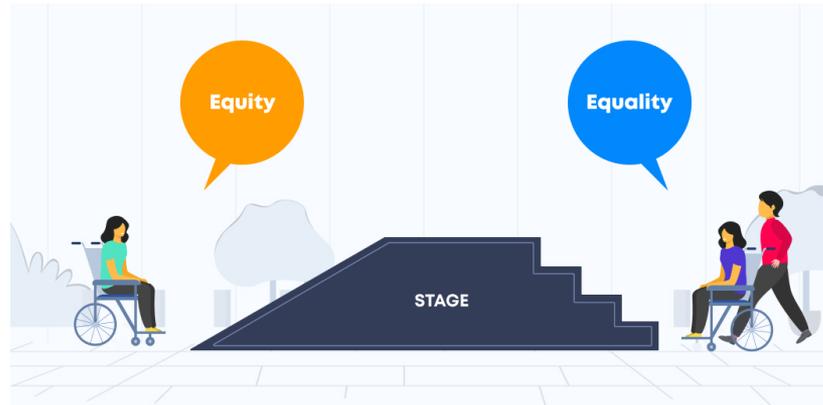
Equity corresponds to the adjustment of needs in order to provide equal access to something. In this case, (web) accessibility can provide and/or guarantee equal access to all resources and places.



Source: Equity Tool

It is important to know that equity and equality do not mean the same (as shown in the picture above)

Equity through accessibility refers to the idea that [accessibility is an important factor in promoting equity and fairness for all individuals](#), regardless of their abilities or disabilities. By making products, devices, services, or environments, including the web, accessible to people with disabilities, we are [creating a more inclusive society](#) where everyone has equal opportunities and the ability to participate fully in all aspects of life.



Source: Net Solutions

For example, web accessibility [helps people with disabilities](#) to participate in education, employment, commerce, and social activities by [allowing them to access the web and its content and services](#). This can lead to [increased independence](#), productivity, and opportunities for these individuals. Accessibility also [benefits people without disabilities](#), such as those who use mobile devices or have temporarily reduced abilities, such as a broken arm.

Unit 4. Accessible Environment

How can we make an environment accessible?

An accessible environment is one that accommodates the needs of people with disabilities and/or overweight individuals, enabling them to move around and navigate the space with ease and dignity.

By creating accessible environments, we can promote equality and ensure that everyone has equal access to public spaces and services.



Source: Workplace Insight

Suggestions no how to create an accessible environment:

1. **Ensure that all areas are easily accessible:** This includes entrances, exits, and all common areas. Make sure there are no steps or other obstacles that could be a barrier for individuals with mobility impairments.
2. **Install handrails and grab bars:** Handrails and grab bars can be very helpful for individuals who have difficulty with balance or walking. Make sure they are securely installed and at an appropriate height.
3. **Create designated accessible parking spots:** Make sure there are designated accessible parking spots that are located close to the building's entrance. These spaces should be clearly marked and wide enough to accommodate vehicles with ramps or lifts.

Suggestions no how to create an accessible environment:

4. **Provide accessible restrooms:** Ensure that there are accessible restrooms with adequate space for wheelchair users to maneuver, grab bars, and raised toilets. Make sure the sinks are at an appropriate height and have lever handles.
5. **Provide clear signage:** Use clear and easy-to-read signage that includes braille and large print for individuals who have visual impairments. Use contrasting colors and avoid using all caps, which can be difficult for some people to read.
6. **Provide seating with armrests:** Provide seating with armrests in waiting areas and common spaces to assist individuals with mobility or balance issues.
7. **Staff Training:** Train your staff to be aware of the needs of individuals with disabilities and how to assist them when needed. This includes providing assistance with doors, elevators, and other barriers.

Other Possible Activities

- ① **Accessibility Audit:** Choose a website and perform an accessibility audit using manual evaluation techniques and automated tools. Identify and document accessibility issues, and provide recommendations for improving the website's accessibility.
- ② **Colour Contrast Checker:** Create a colour contrast checker tool that analyzes the contrast between text and background colours on a web page and indicates whether the contrast meets accessibility standards.
- ③ **Alt Text Exercise:** Choose a web page with images, and add descriptive alt text to each image to improve the page's accessibility for users who rely on screen readers.
- ④ **Keyboard Navigation:** Evaluate the accessibility of a website's navigation using keyboard-only navigation techniques. Identify any keyboard-related accessibility issues and provide recommendations for improvement.
- ⑤ **Screen Reader Exercise:** Use a screen reader to navigate a website and evaluate its accessibility. Document any accessibility issues encountered, and provide recommendations for improvement.
- ⑥ **Captioning Exercise:** Choose a video on a website and add captions to improve the video's accessibility for deaf and hard-of-hearing users.
- ⑦ **Accessibility Guidelines:** Choose a website and evaluate its accessibility according to the Web Content Accessibility Guidelines (WCAG) 2.1. Document any accessibility issues and provide recommendations for improvement.



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Overall Assessment

Choose the correct answer (only one option is correct):

1. Why is accessibility important?

- a) It allows diversity in all fields;
- b) Provides access to something regarding of the possible impediments;**
- c) It's required by universal laws.

2. What is one of the main goals of accessibility?

- a) Equity**
- b) Diversity
- c) Equality

3. Who are the main beneficiaries of accessibility?

- a) Disabled people
- b) Non-disabled people
- c) All of the above**

Overall Assessment

Determine if the sentence is true or false.

- | | | |
|--|------|-------|
| 1. Accessibility can only be used in person. | True | False |
| 2. <i>Equity</i> is a synonym for <i>Equality</i> . | True | False |
| 3. Web accessibility is required by law in Europe. | True | False |
| 4. There are 10 steps to identify and apply accessibility. | True | False |
| 5. Accessibility can be tested in many ways. | True | False |

Fill in the gaps with the missing words

Accessibility is the practice of making resources available to as many people as possible. This will provide a feeling of equity for all users, independent of physical/psychological conditions. Accessibility can be applied to physical and non-physical situations, e.g. ramps to access a space or subtitles on a video.

Overall Assessment

Match the term to the meaning

Accessibility	Create ways to allow access to all kinds of matter.
Equality	Allow the same resources to everyone
Equity	Allow the same result to everyone
Disability	A condition that interferes with a person's ability to engage in something.
Web accessibility	Adaptation to digital and online resources in order to be accessed by all individuals independent of their needs, conditions or environment.



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Module 4
Accessibility for people with disabilities
Best Practices & Resources



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Resources for Further Reading

- ① Uses of accessibility websites in many different contexts - <https://www.youtube.com/watch?v=3f31oufqFSM>
- ① Examples of accessibility in many situations - <https://www.interaction-design.org/literature/topics/accessibility>
- ① Web Accessibility - a legal requirement, but a moral one too - <https://dma.org.uk/article/web-accessibility-a-legal-requirement-but-a-moral-one-too>
- ① *What is accessibility?* - *Learn web development* | MDN. (2022, December 21). [https://developer.mozilla.org/en-US/docs/Learn/Accessibility/What is accessibility](https://developer.mozilla.org/en-US/docs/Learn/Accessibility/What_is_accessibility)

Resources for Further Reading

- ① Introduction to the evaluation of web accessibility - <https://youtu.be/C4GIqWeywil>
- ① Initial checks - <https://youtu.be/lZp8eUAu450>
- ① Tools - https://youtu.be/bn1XJSjc_qM
- ① Conformance Evaluation and Report - <https://youtu.be/u-mOCGX8ckw>
- ① People - https://youtu.be/IIA2zTXq_ts

Resources for Further Reading

- 🎯 Testimonials on equity from disabled people - <https://www.youtube.com/watch?v=0b-pbvqmlc8>

Resources for Further Reading

- ① Tips on creating accessible environments - <https://www.youtube.com/watch?v=Pv1iq7Oz-TQ>
- ① Building accessibility (short documentary) - <https://www.youtube.com/watch?v=-1xgTs28vXw>
- ① Radical Accessibility: Making Buildings Work for Everyone) - <https://www.youtube.com/watch?v=yD-U3Pflo9I>

Best Practices

- ① Adhere to accessibility standards and guidelines, such as the Web Content Accessibility Guidelines (WCAG) 2.1.
- ① Use accessible HTML, including proper headings, alt text for images, and descriptive link text.
- ① Ensure color contrast between text and background meets accessibility guidelines.
- ① Provide captions and transcripts for audio and video content.
- ① Make navigation intuitive and accessible to all users, including those with disabilities.
- ① Regularly test the accessibility of the website using a combination of automated tools, manual testing, and user testing.
- ① Engage people with disabilities in the evaluation process to gather feedback and insights.
- ① Involve accessibility experts in the evaluation process to ensure that the website meets the accessibility standards and guidelines.
- ① Continuously monitor and improve the accessibility of the website over time.

Study Cases



- ◎ The Royal National Institute of Blind People (RNIB) provides a range of resources and case studies on accessibility and digital inclusion, including case studies on the accessibility of websites and mobile apps.
- ◎ The Paciello Group provides a range of case studies on accessibility and inclusive design, including case studies on accessibility in the financial services and retail sectors.
- ◎ The W3C Web Accessibility Initiative provides case studies on the implementation of accessibility in a range of industries and organizations, including government, higher education, and the private sector.

These study cases provide valuable insights and best practices for improving the accessibility of websites and digital content and can help organizations understand the benefits of making their digital products accessible to all users, including those with disabilities.



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Module 5

*Data protection in digital practices of
Physiotherapists and Sport Trainers*



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Glossary of terms:

Term	Definition	Reference
Telehealth	a term under the digital practice umbrella, which encompasses health care services, support, and information provided remotely via telecommunication technology	World Confederation for Physical Therapy. Retrieved from: https://world.physio/sites/default/files/2020-06/WCPT-INPTRA-Digital-Physical-Therapy-Practice-Task-force-March2020.pdf
Cybersecurity	measures taken to protect a computer or computer system (as on the Internet) against unauthorised access or attack.	Merriam-Webster Dictionary (MW) . (2023). Cybersecurity. Retrieved from: https://www.merriam-webster.com/dictionary/cybersecurity
Legal Obligation	A term describing a moral or legal duty to perform or not perform an action which is enforced by a court of law.	Thomson Reuters (2023). Legal obligation. Retrieved from: https://uk.practicallaw.thomsonreuters.com/w-014-8188?transitionType=Default&contextData=(sc.Default)&firstPage=true#co_pageContainer

Glossary of terms:

Term	Definition	Reference
Consent	any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her.	Information Consumers Office (ICO). (2023). Guide to the General Data Protection Regulation (GDPR)/ Consent. Retrieved from: https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/consent/what-is-valid-consent/#top
Third Party	is any natural or legal person, public authority, agency, or any other body other than the data subject, the controller, the processor, and the persons who, under the direct authority of the controller or the processor, are authorized to process the data.	Advisera. (2023). EU GDPR Glossary of Terms. Retrieved from https://advisera.com/articles/eu-gdpr-glossary/
Controller	the person that decides how and why to collect and use the data. This will usually be an organisation or an individual such as a professional practitioner, e.g., a physiotherapist. If you are an employee acting on behalf of your employer, your employer is the controller and must make sure that the processing of that data complies with data protection law.	Information Consumers Office (ICO). (2023). Guide to the General Data Protection Regulation (GDPR)/ Controller. Retrieved from: https://ico.org.uk/for-organisations/guide-to-data-protection/introduction-to-dpa-2018/some-basic-concepts/#7

Introduction

The module "**Data protection in digital practices of Physiotherapists and Sport Trainers**" has been developed to upskill practitioners in implementing **General Data Protection Regulation (GDPR)** practices to ensure consumer protection and organisation compliance.

The main aim of the module is to provide practitioners with knowledge of data protection principles, roles and responsibilities. It will also provide students with the skills required to implement processes to ensure consumer protection and GDPR compliance.

Module objectives:

- ✔ To develop student's knowledge and expertise on current GDPR guidelines and practices
- ✔ Use experiential and innovative learning environment to provide students with an understanding of GDPR regulations and how it can impact their business/organization
- ✔ Provide students with the knowledge required to equip them with the skills necessary to ensure GDPR compliance and consumer protection



Evolution of Digital Technology in Physiotherapy

Digital practices via telehealth create a channel for communicating and delivering healthcare information remotely at a distance.

- ◎ **Telehealth** is a concept that has seen a rebirth following COVID-19 altering how we can provide healthcare from in-person evaluations transitioning to online evaluations with the advances in technology.
- ◎ This increased use of new technologies brings **new ethical** and **professional issues** that need consideration when conducting a **telehealth** consultation.

In this module, you will learn about **Data Protection in digital practices** and its relevance and importance to you as a practitioner and your client.

Learning Outcomes

On completion of this module the learner will be able to:

- ① **LO1** – understand the core principles of The General Data Protection Regulation (GDPR);
- ② **LO2** – understand the rights of data subjects;
- ③ **LO3** – understand professional responsibilities in performing telehealth consultations.

Keywords

- ◎ Telehealth; Online; Digitalisation; Data Protection; Consent.

Estimated seat time

- ◎ To complete the module, you will have to spend approximately **3 hours**

Unit 1. Application of the Health history related privacies

What is “Personal Data”?

Personal Data is data relating to a living individual who is or can be identified either from the data or the data in conjunction with other information that is in or is likely to come into the data **controller's** possession.

Examples in practice include:

- ✔ clinical notes - paper note with a phone number and name;
- ✔ clients online booking system records.

Unit 1. Application of the Health history related privacies

What is “Sensitive Personal Data”?

the “**Data Protection Act 2018**” states that it is any personal data relating to –

- a) the racial or ethnic origin, the political opinions or the religious or philosophical beliefs of the data subject,
- b) whether the data subject is a member of a trade union,
- c) the physical or mental health or condition or sexual life of the data subject,
- d) the commission or alleged commission of any offence by the data subject, or
- e) any proceedings for an offence committed or alleged to have been committed by the data subject, the disposal of such proceedings or the sentence of any court in such proceedings.

Unit 1. Application of the Health history related privacies

What is GDPR?

- ① **The General Data Protection Regulation (GDPR)** is a European Union (EU) data protection law that provides a set of rules to enhance consumer protection and creates obligations for physiotherapists on how they collect and store patient data (in person and online).
- ② **GDPR** ensures that clients always own their data and that it is used for purposes for which they have given direct informed consent on.
- ③ In your role as a professional, you are responsible for protecting personal and sensitive information collected from your clients as per **GDPR**.

Unit 2. GDPR in practice

Scope of practice

- ☉ Check with your registration board or professional body to see what limitations are on your scope of practice when using telehealth.

Note: **Scope of practice** will vary for physiotherapists within and between different countries, so you must check that you are licensed to treat a patient in a different region before performing consultation online.

Unit 2.

GDPR in practice

Cybersecurity

Ensure to consider all aspects of your business online. Take the following precautions:

- ① ensure your website or app cannot be hacked;
- ② use a video-call platform service that encrypts calls end-to-end;
- ③ backup and store patient data securely.

Are you using **third parties** to process or store data, like exercise program software or electronic notes?

- ④ Ensure that these third parties process and store the data on their systems according to **GDPR** requirements.

Unit 2.

GDPR applications

Record-keeping guidance

- ◎ Physiotherapy staff have a **professional** and **legal obligation** to record patient interactions accurately. These records are legal documents that can be called upon in various situations.
- ◎ Patient records also help to drive high standards of patient care.
- ◎ As per **GDPR**, you must have a good reason for having the data and be able to justify why you are using or keeping it. You must obtain client consent for any record you plan to keep.
 - **Including:** if you use a smartphone to text or call clients, it stores their name and contact details – this counts as ‘keeping records’.

Unit 3.

GDPR Patient Consent

Patient Consent as per GDPR is defined as:

“data subject means any freely given, specific, informed and unambiguous indication of the data subject’s wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her”.

It must be:

- ✔ Consent must be freely given;
- ✔ Consent must be specific;
- ✔ Consent must be informed;
- ✔ Consent must be unambiguous
- ✔ Consent can be revoked

Unit 3.

GDPR Patient Consent

Patient consent

As with any client interaction, informed consent must be obtained before undertaking a telehealth assessment or treatment.

Additional issues to consider when using digital technologies include:

- ✔ provide informing clients on online assessments, treatments, and strengths and weaknesses, which may differ based on their technology skills.
- ✔ miscommunication, especially when working with vulnerable groups, such as older adults or children (a parent/caregiver or advocate should be present).

Patient consent

Questions to inform your client on:

1. Why you collect and how you (plan) to use their personal information?

Examples include:

- ✔ (why) as part of your medical records during online evaluation assessment and treatment for your condition.
- ✔ information will be kept on successful treatment plans and previous rehabilitation strategies to improve professional understanding and inform future injuries that (the client) may present with, which is of benefit to the client when they return for follow-up treatment or recurring injury.
- ✔ storing of an email address and mobile number to contact clients with receipts, appointment reminders, home exercise plans, and follow-up with a client during their injury management.

Patient consent

Questions to inform your client on:

2. Do you share client's personal information?

Example:

- ✔ No client's personal information will not be shared with any third parties.
- ✔ Client personal information and treatment notes are securely hosted on a physiotherapy specific practice management software package.
- ✔ If professional will need to correspond with another Healthcare Practitioner on client's behalf, e.g., GP or a consultant, client consent will be obtained in advance.

Patient consent

Questions to inform your client on:

3. For how long will you retain client's personal information?

Example: from the [*Irish College of General Practitioners*](#)' guidelines:

“In general, medical records should be retained by practices for as long as is deemed necessary to provide treatment for the individual concerned or for the meeting of medico-legal and other professional requirements. At the very least, it is recommended that individual patient medical records be retained for a minimum of eight years from the date of last contact or for any period prescribed by law (in the case of children’s records, the period of eight years begins from the time they reach the age of 18).”

Unit 3. GDPR in practice

Patient consent - checklist

Prior to any treatment, consider a **consent checklist** to identify what you need and how you will:

Example:

- ✔ provide clear and concise information about telehealth and charges;
- ✔ discuss how and why you plan to see them via telehealth than in person;
- ✔ obtain written or verbal consent prior to commencing a session;
- ✔ obtain additional consent if video recordings or images are taken during the session.

Note: check in with your professional body or board, as they may have a consent checklist.

Unit 4. National and EU practices

The Europe Region World Physiotherapy

a **non-profit, non-governmental organisation** that represents the physiotherapy profession at European Level.

- ◎ The Organisation has a membership of 38 Physiotherapy Associations, one from each of the European countries, including all the EU Member States, EEA countries and all the EU applicant countries, representing approximately 173.000 physiotherapists in Europe.

Unit 4.

Examples of platforms for data storing and sharing

- ① **PowerDiary** - is a simple, but extremely powerful online GDPR compliant practice calendar. <https://www.powerdiary.com/general-data-protection-regulation-gdpr/>
- ① **Physitrack Telehealth** - provides access and information sharing, and support patient self-management via secure GDPR compliant features. <https://www.physitrack.com/>
- ① **Vimeo** - is a video-sharing website that allows members to view, upload and share videos. <https://vimeo.com/>
- ① **Physiotools** – a comprehensive exercise library software platform created by professionals for professionals. www.physiotools.com/



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Data Protection Commission. (2023). *Data Protection Commission*. Homepage | Data Protection Commission. Retrieved February 28, 2023, from <https://www.dataprotection.ie/>

Overall Assessment

Choose the correct answer (only **one** option is correct):

1. Which of the following is considered an item of client 'Personal Data'?

- a) client name;
- b) client consent form;
- c) client booking record;
- d) all of the above .**

2. What does the 'GDPR' abbreviation stand for, the...?

- a) General Duties Protection Regulation (GDPR);
- b) General Data Protection Regulation (GDPR);**
- c) General Data Practitioners Record (GDPR).

3. Finish the sentence with the correct option "Consent must be...?"

- a) generic;
- b) informed;**
- c) ambiguous.

Overall Assessment

Determine if the following statements are **true or false**.

1. Physiotherapy staff have NO professional or legal obligation to record client's interactions accurately.

True

False

Fill in the gaps with the **missing** words

A **third** Party is any natural or legal person, public **entity**, agency, or any other body other than the data subject, the controller, the **processor**, and the persons who, under the direct authority of the controller or the processor, are authorized to process the **data**.



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Module 5
Data protection in digital practices of
Physiotherapists and Sport Trainers
Best Practices & Resources



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Resources for Further Reading

① **Data Ethics Canvas** – a free tool for anyone who collects, shares or uses data to help identify and manage ethical issues – at the start of a project and throughout.



② **Remote consultations professional guidance** – The Chartered Society of Physiotherapy (CSP) is the professional, educational and trade union body that provide free guidance and resources to practitioners on remote consultations. Link - <https://www.csp.org.uk/professional-clinical/professional-guidance/remote-consultations>

③ **Data Ethics and GDPR** - Chartered Society of Physiotherapy, UK

Study Case – HCPC - Breach of confidentiality

Scenario – an occupational therapist's employer raised concerns with the Conduct and Competence Committee after the registrant left a notepad containing confidential information about service users at the home address of a service user.

- ⦿ Despite being aware that the **notepad contained confidential information**, the registrant needed to **recover the notepad promptly**.
- ⦿ The **Conduct and Competence Committee** imposed a twelve-month caution order to protect the public following proceedings.
- ⦿ **Link:** <https://www.hcpc-uk.org/concerns/case-studies/breach-of-confidentiality/>