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Augmentative and alternative communication (AAC) methods in physiotherapy

Self-learning material for physiotherapy
students

DEGREE PROGRAMME IN PHYSIOTHERAPY
2023

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	<p>Number of pages 34</p>	<p>Language of publication: English</p>
<p>Augmentative and alternative communication (AAC) methods in physiotherapy: Self-learning material for physiotherapy students</p>		
<p>Degree Programme in Physiotherapy</p>		
<p>Abstract</p> <p>Communication is one of the main elements in physiotherapy. Communicating by verbal speech is the most common type of communication between client and professional, yet not only. There are approximately 65 000 people only in Finland, who have speech and communication limitations or difficulties. Lack of communication tools might be crucial for achieving high-performance client care. Augmentative and alternative communication methods are a key for communicating with clients with whom we cannot just talk with normal speech with.</p> <p>The aim of this thesis was to find evidence-based information on AAC methods and how those can be used in physiotherapy. The objective of this thesis was to provide physiotherapy students in any point of their studies a possibility to endorse their skills in communicating with Augmentative and Alternative Communication methods.</p> <p>After collecting knowledge about Augmentative and alternative communication and finding the connections to physiotherapy, a self-study material was made based on that theory base. The educational material was completed using the Moodle learning platform, and the content was created utilizing H5P, an open-source framework for collaborative content development built upon JavaScript.</p> <p>It was found out that the need of AAC use in physiotherapy is recognized, but many physiotherapists are not educated to use the methods. With this educational material future physiotherapists have an opportunity to enhance their knowledge.</p>		
<p>Keywords AAC, Augmentative and alternative communication, aided communication, unaided communication, communication, physiotherapy</p>		

CONTENTS

1 INTRODUCTION	4
2 AIM AND OBJECTIVES.....	5
3 AUGMENTATIVE AND ALTERNATIVE COMMUNICATION	6
4 TOOLS.....	7
4.1 Non-technical	7
4.1.1 Signing.....	8
4.1.2 Body language & touch	9
4.1.3 Auditory and non-verbal communication.....	10
4.2 Low-technical.....	11
4.2.1 Communication books & boards	12
4.2.2 Drawing and writing	13
4.3 High-technical	15
5 CLIENT GROUP EXAMPLES TO USE AAC TOOLS WITH	16
5.1 Intellectual impairment	16
5.2 Autism spectrum disorders.....	17
5.3 Stroke and traumatic brain injuries	18
5.4 Aphasia.....	19
5.5 Amyotrophic lateral sclerosis (ALS)	20
5.6 Cerebral palsy	21
5.7 Dementia	22
6 PRACTICAL USE IN PHYSIOTHERAPY.....	23
7 TRIAL FOR THE SELF-STUDY MATERIAL AND STUDENT FEEDBACK..	25
8 THESIS PROCESS AND METHODS.....	26
9 DISCUSSION	27
REFERENCES	
APPENDICES	

1 INTRODUCTION

In Finland, there are approximately 65 000 people with varying degrees of speech and communication difficulties and restrictions. Of them, around 30 000 require the use of some speech-replacing or supporting assistive devices. The lack of recent assessments or studies for the number of people with speech impairments has hindered their inclusion in legislation and services, including health care such as physiotherapy. The last estimated number of people who have these speech impairments (65 000), which was made 20 years ago in partnership with speech impairment organizations, is now recognized as a significant underestimate, as it does not account for the significant decrease in communication abilities caused by conditions like cerebrovascular disorders, dementia, or childhood language disorders. (Kehitysvammaliitto, n.d) In cases where a patient with speech or communication impairments seeks physiotherapy services, it is important that the physiotherapist has understanding of communication alternatives and a set of communication tools to effectively engage in the rehabilitation with the patient. Acquiring proficiency in these communication techniques and having the skill to use and utilize appropriate tools significantly expands the physiotherapist's capacity to establish meaningful, suitable, and functional communication with the patient.

The Degree program in Physiotherapy at Satakunta University of Applied Sciences is the orderer for this thesis. The purpose of the thesis is to provide physiotherapy students with the opportunity to enhance their skills in serving patients who face communication challenges. The author in this thesis will focus on different ways of augmentative and alternative communication in the physiotherapist and physiotherapy client point of view. The author hopes to find communication styles which can be intervened in practical patient-physiotherapist -communication during physiotherapy sessions and rehabilitation.

Effective communication is essential for physiotherapy students to provide patient-centered care, ensure treatment adherence, and collaborate with healthcare teams while also respecting diverse backgrounds and promoting patient empowerment. It plays a crucial role in building trust, obtaining informed consent, and delivering ethical and holistic care to patients of all backgrounds and conditions. (Physiopedia, 2023)

2 AIM AND OBJECTIVES

To aim of this thesis is to find ways to use augmentative and alternative communication tools and methods in practical physiotherapy. For being able to professionally connect the augmentative and alternative communication to client work in physiotherapy, enough evidence-based knowledge of the topic must be collected. The objective of this thesis is to provide physiotherapy students in any point of their studies a possibility to endorse their skills in communicating with Augmentative and Alternative Communication methods.

The students can use this self-study material as additional learning material related to some course they are participating (for example related to courses of client-centered rehabilitation, accessibility and participation or adapted physical activity), in their clinical practices or even looking forward to their future job and endorse their skills as a physiotherapist cooperating with clients with various communication styles. With augmentative and alternative communication skills the physiotherapy students can give better and more professional services for clients with speech difficulties, not depending on the reason behind those. Communication is key element in any physiotherapy service, and with wider and more flexible communication possibilities, the quality of communication between physiotherapist and the client enhances.

The self-study material can be accessed through Moodle, where any student with SAMK student account can get to. The Moodle self-study material was collected together based on the theory gathered in this thesis paper. On Moodle, the self-study material is available in H5P learning tool. There will be learning possibilities with

theory-based information combined with active learning. The self-study material was run through with students studying years 2-4 in Physiotherapy degree program and based on their comments some adjustments can be made before publishing. The focus in the study material will be on practical communication knowledge which can be exploited straight to physiotherapist's client work.

3 AUGMENTATIVE AND ALTERNATIVE COMMUNICATION

Augmentative and Alternative Communication (AAC) refers to diverse ways of communication modalities that individuals can use when facing challenges related to either spoken language or speech. This approach involves "augmentative" methods, which enhance or supplement verbal speech, as well as "alternative" methods that replace verbal speech. While some individuals rely on AAC as a continuous way communication, others may utilize it for temporary periods, such as during post-surgery recovery, when verbal communication is temporarily hindered or more difficult than regularly for the individual. (ASHA, n.d.) AAC is not only about using technology to bring out words. It can also be valuable in helping to understand what others want to communicate out and assisting with memory retention, as well as guiding individuals or groups through the various steps of an activity or an exercise. Simpler and more straightforward instructions enhance patient compliance and to endorse achieving better treatment outcomes. (O'Rourke, 2020) Ability to communicate and come forward with own outcomes in the is a human right. Augmentative and alternative ways of communicating enhance accessibility, which plays a significant role in participation in communities. (Kehitysvammaliitto, 2023)

“Like any clinical skill, communications can be learned and honed. With the connections between communications and patient outcomes, this is a skill that requires dedication. As a physiotherapist, you're not just providing care—you're showing care. Ultimately, both have an effect on a patient's well-being.” (College of Physiotherapists of Ontario, 2022)

Individuals with disabilities have expressed that their engagement in various activities is influenced by factors such as their ability to make choices and control their actions, their access to opportunities, the meaningfulness of their involvement, their social connections, and their capacity to provide support to others. The extent of their participation in these activities can differ based on the severity of their condition, their age, their ability to self-manage, and their level of mobility and integration within society. (Septhon, 2020) Anyone, whose speech and understanding capabilities are not fulfilling their everyday communication needs, can benefit from using AAC methods. (McDaniel, 2021)

People may choose from a variety of AAC options since communication takes many forms. An AAC system encompasses all the tools and resources of this kind that an individual employs to support their communication needs. In some cases, the patients might need help from a physiotherapist on using their hands and body when communicating non-verbally. At those situations, they might come for physiotherapy for getting instructions how to communicate with their own body in the most efficient way. (ASHA, n.d.) This thesis, along with the associated individual learning material available on Moodle (instructions are provided in the introduction section), will introduce various Augmentative and Alternative Communication (AAC) methods. The choice of these methods in this thesis is made based on their prevalence and suitability for the patient groups and conditions that physiotherapists commonly engage with in their practice.

4 TOOLS

4.1 Non-technical

Non-technical AAC methods and tools refer to techniques that can be done using only user's body. It is often a benefit in communication that signs and gestures can be done rapidly in moment, they do not require carrying any tools and user can impress the widest variety or different words often by these methods. Non-technical

communication can also be taught to kids at young age before they can read or use complex applications. (Vanderbilt Kennedy Center, 2012) Another term used for non-technical communication tools on some environments is unaided communication. (ASHA, n.d.)

Non-technical tools, such as touch and body language are important in physiotherapy, cause often at physiotherapy session the therapist has to be somewhat close to the patient, which requires that both participants are comfortable with the close professional contact. Non-verbal, non-technical communication is important in building patient-therapist relationships. While majority of communication often tends to be verbal, can non-verbal communication be also crucial for having effective and trusted physiotherapy. (NBelber, 2020)

4.1.1 Signing

There are numerous sign languages globally, primarily used by deaf individuals but also by those who are partially hearing-impaired, acquired deafness later in life, or have typical hearing. These sign languages vary in signs and grammar across countries, but there are common elements that facilitate communication among people using different sign languages. International Sign language consists of a limited set of widely recognized signs and basic grammar rules. Its primary aim is to facilitate communication among individuals who use diverse sign languages. (Culture for All Service, 2023)

According to Finnish law of interpretation (133/2010, Finlex.fi) it is possible for clients to get sign language interpreter for health care appointments. On normal basis in Finland, it must be organized by the hospital, but on private side it is possible for the client with hearing- or speech-impairment to apply for interpreter from Kela. (Kuuloliitto, n.d.)

There are several options for learning and translating sign language, but most of them seem to be teaching American Sign Language (ASL). In Finland, Finnish Sign Language can be pursued as an academic subject in various institutions; however, it is

not typically included in the core curriculum of basic healthcare programs, such as those leading to a degree in Physiotherapy. (Satakunnan Ammattikorkeakoulu, 2023)

If all the participants in communication situation do not master the same sign language, or do not have skills in any of the official sign languages, can some non-official hand movements, thumbs up and down, waving, pointing, clapping, and snapping fingers. This types or hand and finger signs are called as speech-supporting signs or keyword signs (terms from Finnish sign bank). These can also be used to support other communication, since they are fast to do without further planning and widely known amongst people. (Communication Community, 2019)

4.1.2 Body language & touch

Non-technical AAC can include also forms of natural interacting, including gestures and facial expressions. These are easy to understand also for people outside of AAC, who use speech communication as their main tool. (ASHA, 2023) Non-technical communication can include various movements of the body, such as shaking head (often used to refer to either answers yes or no), blinking and changing the point where to look (to point for example directions), tapping or kicking legs or as simple and often used movements as nodding. (Communication Community, 2019)

It is not always simple and easy for the patients to talk about the pain they are experiencing or about how certain things feel either physically or mentally. By patient's body language, you can get additional or corrective information on how their pain or feeling is. Body language can be either volitional or subliminal, meaning they can be done either on purpose or without own notice. Physiotherapist can for example observe from patient's body language if they prefer one side over another while doing therapeutic exercises and if their movements are confident and intentional or not. Also, the other way around, it is important for the physiotherapist to have body language which supports the communication between the patient and the professional to give patient during the appointment the feeling of trustworthiness and professionalism. (NBelber, 2020)

Through the mechanoreceptors humans can feel different types of touch. (Henley, 2021) Touch sense is a way for identifying feelings of pressure, pain, temperature, and vibration. (Burakoff, 2018) With the information from receptors, it is possible to identify where, how strongly, for how long, moving to which direction, how shaped or which and what type of texture is the object or person touching the skin. (Henley, 2021) These touch experiences help to understand the outlines of the body and limbs and with using that information, learning movements. (Burakoff, 2018)

In physiotherapy, touch sense takes role on, as mentioned above, in learning about body structures and movements but also one important information gotten from touch is pain. The physiotherapist must communicate continuously with the client, to be able to touch the client without causing unnecessary pain or making the client feel uncomfortable. Touch can be used to teach the body (Burakoff, 2018) or to export feelings. Especially during Covid-19 restrictions in physical presence, it was noticed in health care how the absence of touch communication affected on the efficiency of patient care and lowered client satisfaction. (Dunkley, 2022).

4.1.3 Auditory and non-verbal communication

Speaking words is the most common way of auditory communication, and there are many ways to support the verbal communication by speaking tones, speed and putting emphasis on different parts of words and sentences. Auditory communication can also mean vocalizations, verbalizations and even other sounds made verbally. (Lewis, n.d.)

As called nonverbal communication can either support the verbal message, to change it or even overturn it. Nonverbal communication must be synchronized with verbal communication in order not to send mixed messages. If speech and nonverbal communication do not bring out same message, non-verbal communication overlaps verbal communication and its message. Ways of non-verbal communication can be following; tone, timbre, speed of speech, intonation, stance, use of space, eye-contact, clothing, and physical appearance. (Erho, n.d.)

According to von Kriedstein's multisensory perspective of auditory communication, it is, as supposed, more difficult for humans to communicate with only the input coming from only one communication modality. The studies show that having auditory and visual input together supports the understanding. If having only one modality at once, communication must be simple and the listening conditions good in order to comprehend the message. (von Kriegstein, 2012, chapter 34)

4.2 Low-technical

If categorizing communication methods to unaided and aided, would both, low- and high-technical take part in aided communication. (ASHA, 2023) In this thesis these two, low- and high-technical, are divided into their own categories to make the learning process simpler for students. Low-technical augmentative and alternative communication refer to tools which work without electricity. They are often on paper, either readymade or drawn or written during the conversation (Organization for Autism Research, 2023)

Compared to high-technical options, low-technical tools are often a bit cheaper and available easily. They can be adjusted for the user and accessed with low investments. Most often in hospitals low-technical devices are the best option to use because of their availability and accessibility. (Paterson & Malik, n.d.)

According to Paterson and Malik's guide, it is needed to ask first the client's own will about using communication tools and after that for the professional or communication partner to evaluate the functional side (where will they use the tool and who are they communicating to with tool), access-related issues (can they use their fingers, can they see and hear properly and do they have the fine motor skills and coordination to use the tool while doing other activities) and language skills (can they read, spell, identify words) of the client.

4.2.1 Communication books & boards

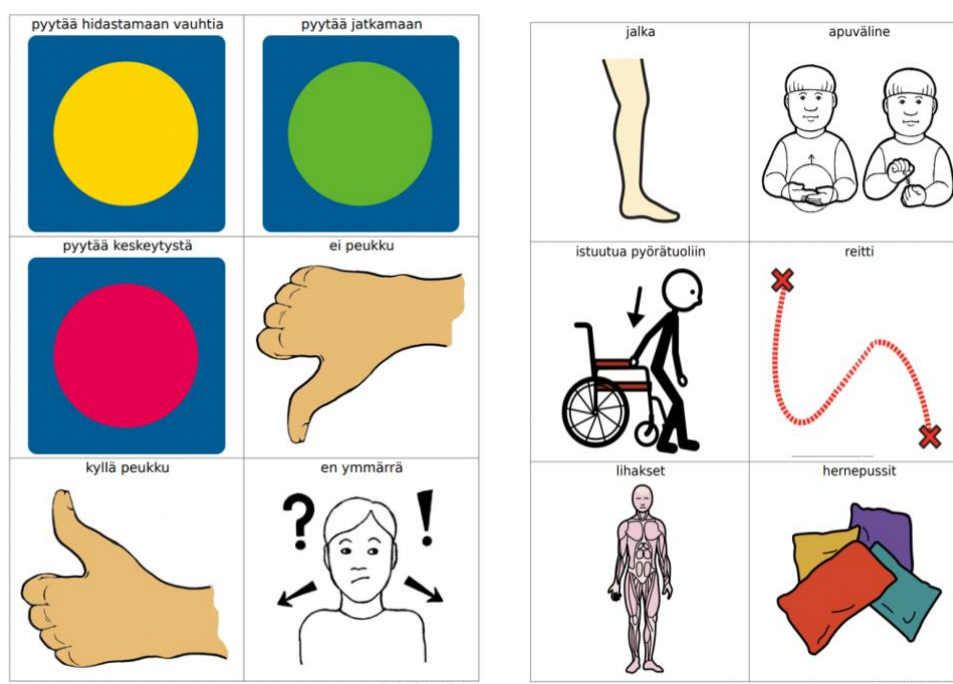
Communication books and boards are a way to low-technical communicate with readymade pictures, photos, symbols, or illustrations. Both, the patient, and the physiotherapist can use communication boards during the therapy sessions. Boards can be used to express needs or feelings (such as: needing a glass of water, experiencing pain, needing a break etc.), to ask questions or to bring up their desires, decisions, or preferences. Communication boards are usually readymade, they can be on only one sheet of paper/board, or they can be collected as a book or a folder with increased number of pictures. (Organization for Autism Research, 2022)

The Picture Exchange Communication System (PECS) was invented by Lori Frost and Andrew Bondy in 1984 on its goal to invent a fast and functional communication system for kids with autism. After studies made of PECS technique, it has got more used also amongst other people with communication difficulties besides users with autism. (National Autism Resources, n.d.) On the upcoming chapter in this thesis high-technological tools will be introduced. PECS is one good example of a tool, which work well as both, low- and high-tech.

On Berg et al.'s (2006) research, communication boards were used with critically ill patients when they were having endotracheal tubes, which intercepted their speech possibilities. These patients did not have previous experience in communication board use, but according to the research they were less frustrated to communicate about their needs with the help of a communication board than without. After the study, the patients had specific ideas about which subjects should be shown on the board for it to be the most beneficial for the situation. This study proved that also physiotherapists working for example in intensive care units or with other patients with for example endotracheal tubes, could collect together a board with suitable pictures or terms for clinical use.

Finnish website for accessible communication, Papunet (papunet.net) offers multiple different tools for communication pictures and communication boards. They have a photo bank of 39 000 communication pictures and even a tool to collect them together

as a board. Some of the photos are free to use for clients' own use, but for some client needs to purchase a license. It is also possible to upload pictures from user's own computer to the tool. In pictures 1 and 2 you will find an examples of communication boards made with Papunet's tool. (Papunet, 2023) In physiotherapy use, it is a good benefit to be able to insert pictures uploaded from own photos. That allows the usage of for example more specific picturing of individual assistive device, exercise, or movement. Pictures are helpful when moving to an activity to another. (Siunsote, n.d.)



Picture 1 : Example of communication boards with pictures suitable for physiotherapy use. Made by/Source: kuvatyökalu.papunet.net / Papunet's photo bank (Creative commons)

Picture 2 : Example of communication boards with pictures suitable for physiotherapy use. Made by/Source: kuvatyökalu.papunet.net / Papunet's photo bank (Creative commons)

4.2.2 Drawing and writing

Quick Drawing Communication System is tool for example for situations, when either not having any other communication tools present or the person you are communicating with is not familiar with more specific tools. In this communication

style you must have enough paper (or a tablet screen) and pens, preferably at least one for every person in the communicating situation. Main idea in this Quick Drawing Communication system is for the (health care) professional to ask simple enough open questions, which the patient replies to by drawing their reply on paper.

When something is drawn on paper or to screen, it is visible in a same way to every participant in the communication. Drawing can be simple or detailed, depending on the message that is brought in with the drawing. Paper is also something that the client can take to home from the appointment and get back at it when they feel the need. (Merikoski, 2020)

Writing aids (pencil grips, ring-pens, weighted pens or writing mats) can be used to help drawing and writing communication. (eSpecial Needs, n.d.) If client needs more specific od individual fine motor assistive devices to communicate by writing or drawing, client can in in some cases be forwarded to multiprofessional rehabilitation with occupational therapist.

According to Paterson and Malik (n.d.), it must be considered if it is easier for the client to use low-case letters, high-case letters, or the combination of both. Also, some clients might need the text to be on a bit bigger font (especially when moving or doing activities while reading) and additionally the color of the text must be visible enough. (Paterson and Malik, n.d.)

On Lyon et al.'s (2020) study on how drawings are used in health care as clinical communication, it is noted that professionals find drawings useful and pleasurable. In this study drawings were made to describe or explain some clinical contexts, such as body structures or functions. The drawings were made during the appointment to teach and educate clients about medical or health related subjects or actions. In this study the work of seven professionals from different fields were examined, it was not mentioned if any of them were physiotherapists, but as very little formal research has been done on the topic of professionals drawing to clients, his could be adapted also to physiotherapy-related client education. (Lyon et al, 2020)

4.3 High-technical

High-technical augmentative and alternative communication refers to tools that use electricity, they can be for example tablets, computers, or speech-generating devices. (Organization for Autism Research, 2023) Most of the high-technical devices for speech disabled clients are possible to get in Finland through public services. Medical rehabilitation (in Finnish lääkinällinen kuntoutus) is available for those clients who have diagnosed and assessed to have illness, disability or injury that lowers the client's functional capacity and hinders their independent coping. (Tikoteekkiverkosto, n.d.)

There are nowadays multiple communication applications available to user's own devices in AppStore and on Google Play store (availability and prizes checked from AppStore and Google play on 28.10.2023). On the table 1 below applications are briefly introduced with their current (28.10.2023) prizes and availabilities.

Table 1: High-technological AAC application examples from AppStore and Google Play store.

Application	Developers' information	Where to find and languages	Prize
Board Communicator – AAC Speech Aid	<ul style="list-style-type: none"> -Easy to use communication board app -Customizable for individual needs -Suitable for children 	<ul style="list-style-type: none"> -AppStore for iPhone, iPad, iPod touch and Mac -Available on 34 languages including Finnish and English 	5,99€ (one time charge)
SymboTalk – AAC Talker	<ul style="list-style-type: none"> -New AI assisted app that speaks aloud the words on communication boards when clicking them, also full sentences can be made -Works offline 	<ul style="list-style-type: none"> -AppStore for iPhone, iPad, iPod touch and Mac (account can be synchronized between devices) -Available fully in English, Finnish supported as a speak language 	Free upload, subscription price 0,99\$/month with one month trial period
Cboard AAC (available online on https://app.cboard.io/)	<ul style="list-style-type: none"> -For children and adults -Symbols to speech and text to speech-possibilities -More than 3400 symbols -Personalized boards 	<ul style="list-style-type: none"> -Google Play for Android-mobile devices and Windows-laptops -AppStore for iPhone, iPad and Mac -Available fully on over 40 languages 	Free with in-App purchases



Picture 3: Cboard application on smartphone and on laptop. (Source: cboard.io)

When using AAC high-technological devices, such as tablets the user must have the knowledge to use the device and use the app. Especially with younger clients, a strong team approach for communication must be used. It is not beneficial for the client with communication difficulties to have too many different communication modalities un use each with a different professional. If the client is still a pupil or a student, it is needed for the physiotherapist to cooperate with the school about communication tools and techniques. For the client it is often better to be able to communicate well with one tool, than have multiple for different occasion while maybe mixing them up. (Landon, 2018)

5 CLIENT GROUP EXAMPLES TO USE AAC TOOLS WITH

5.1 Intellectual impairment

Intellectual impairments, or more often still called Intellectual disabilities (ID) are a term used to describe when an individual has specific cognitive functioning limitations or difficulties in abilities as social and practical skills. The cause for ID can be either disease, injury, or brain-related issue. Estimated amount of people having intellectual

disabilities worldwide is 1-3 percent. People with ID can cause hindered development and learning. (Special Olympics, n.d.)

For people with intellectual disabilities the best form of communication might change throughout their development especially in the childhood. On the situation where the communication tool must be switched or added, they often need time and effort on learning to use it. For clients with ID, it is possible to get AAC devices from special health care. (Kehitysvammaisten tukiliitto, 2017)

According to Autti-Rämö and Koivikko (2006), rehabilitation such as physiotherapy cannot change or minimize the impairment but can help the client to integrate their functional abilities to what the environment and society requires. When doing exercises or activities with clients having intellectual disabilities, they might need multiple repetitions of parts of the activity to be able to perform the whole exercise or activity. Client with intellectual disability sometimes might seek communicational contact to others in atypical manners, so physiotherapist must stay alert on noticing also these less typical manners of communication. They might not have patience for long verbal instructions, so instructing might be more effective on short parts enhanced with visual tools. (Autti-Rämö and Koivikko, 2006)

On Burke et al.'s (2020) cross-sectional study about adults with intellectual disabilities (N=601) experiencing communication difficulties 57,9% of participants answered that they have experienced some communication difficulties, 23,5% of them described the difficulties to be severe. 75,1% of all participants communicated verbally, the rest with different AAC methods (not specified in the study). More than half of them finding it difficult to communicate with professionals. This result tells how professionals should learn to communicate better with these clients for better treatment and service outcome. (Burke et al, 2020)

5.2 Autism spectrum disorders

Autism spectrum disorders (ASD) are neurodevelopmental disabilities which effect widely on characteristics of social interaction and communication. (Casey et al, 2020)

As only diagnosis, autism spectrum disorders are seldom the only reason for coming to physiotherapy. Clients with autism spectrum disorders can especially during childhood have care contacts to speech or occupational therapy so often their care is multiprofessional. (Käypähoito, 2023) Many clients with ASD's are visual learners, which is good to take into consideration when planning activities and educating them. For them it might be beneficial to have instructions and schedules on visual form rather than just giving verbal instructions. Supporting the performance of specific task or exercise by having display pictures of each step of the task could help on succeeding. (McDaniel, 2012)

Signs and gestures are a useful communication tool with autism spectrum clients, either to support verbal communication or alone. Signing requires some motor skills, but at the same time making signs can be a motor exercise. With some children with ASD, it might be easier to communicate with 'Baby Signs' rather than more complicated signing. Baby signs are signs which take their base from natural reactions. (McDaniel, 2012)

PECS communication system, which was already introduced on chapter 4.2.1, was first invented for clients with autism spectrum disorders. Using picture communication systems helps clients to communicate more complex messages. (McDaniel, 2012)

While clients with autism spectrum might have some good kind of out-communication tools they can utilize and engage in their communication, it can be difficult for them to understand non-verbal physical behaviors, especially when communicating about feelings or emotions. Therefore, the physiotherapist must be clear with bringing out emotions and for example giving non-verbal feedback during activities and appointments. (Baraiolo, 2020)

5.3 Stroke and traumatic brain injuries

On Hamilton and Chou's (pp.212-247, Routledge 2014) chapter about self-telling body they tell a realistic and typical example about how the ability to speak can change after having a stroke: *"A person suffers a large stroke. He loses the power of speech*

and can only say `mem-mem-mem` over and over. He is brought by ambulance to the hospital, emergently given an MRI of his brain, found to have had a devastatingly large stroke encompassing the language processing centers of the brain, established in a neurological intensive care unit berth, given medication to thin his blood and slow his heart rate and drop his blood pressure. His wife rushes intensively to his side to find him able to say only `mem-mem-mem`.” (Hamilton and Chou, 2014)

This person is likely to be also a physiotherapy client on most cases. In Finland, approximately 10 000 persons get a stroke yearly. (THL, 2023) After the acute stage, even 45% of these patients need rehabilitation. While producing speech might still be difficult, speech can be hard to understand or words can be missing, is it better to start rehabilitation early enough. On this situation the client needs support with communication. They can have trembles or difficulties to produce controlled and precise movements (Mehiläinen, n.d.), which can affect on some of the communication methods mentioned above. On some cases stroke can cause aphasia, which will be introduced on next chapter. (American Stroke Association, 2018a)

Physiotherapy for traumatic brain injuries is on most cases related to either other injuries or in balance training. Often physiotherapy starts already at the hospital, at the same time when also speech therapist works with the client. On that time, it is good to work multiprofessionally to get communication enhancing instructions from speech professional. With clients having traumatic brain injuries the issues with communication often come from un-understanding. It can be either frustration of others not understanding their communication or not understanding what others have to say. (Tenovuo, 2020 p. 23, 29-30)

5.4 Aphasia

Aphasia is a disorder that is most often caused by strokes. Aphasia effects on the abilities to produce language, often after stroke that is because the left side of the brain, which produces and controls language and speech is damaged. Often these clients stay mentally receptive, but the producement of speech is detoriated. Therefore, the loss of speech capabilities often frustrates clients with aphasia. They might have difficulties

first understanding what others tell and then difficulties with finding the words and saying them out loud. (American Stroke Association, 2018b)

Clients having aphasia can continue improving their speech, communication, and language skills for years. Therefore, if having longer patient-relationships with clients with aphasia, the type of communication is likely to change during the rehabilitation period. Communicating with aphasia client is often usual professional speaking to client with simple verbal communication and client answering with either speech, gestures, pointing or drawing. Additionally, electronic devices can be used with aphasia clients, learning capabilities to new things are not usually disturbed. (NIH, 2017)

With aphasia clients there is according to Kiran's (2018) study good benefit and results from using speech and communication apps. She studied that any caregiver or professional who is on regular contact with the client can improve their communication. According to her, using AAC apps is also beneficial for the producing of speech in addition to having the benefits of present communication. (Kiran, 2018)

Aphasia clients can communication wise benefit from both, individual rehabilitation, and group rehabilitation. When they first learn to communicate on individual sessions, they can also participate to groups if that in addition to communication strengthening, improves their physical rehabilitation. (NIH, 2017)

5.5 Amyotrophic lateral sclerosis (ALS)

“Almost all people with amyotrophic lateral sclerosis (ALS) experience a motor speech disorder, such as dysarthria, as the disease progresses. At some point, 80 to 95% of people with ALS are unable to meet their daily communication needs using natural speech.” (Beukelman et al. 2011)

Amyotrophic lateral sclerosis (ALS) is a progressive motor neuron based neurological disease, which effects on brains and spinal cord. In ALS motor nerves which command muscles step by step wither. The cause of ALS is unknown. Every ALS client will

have an individual rehabilitation plan designed. On some types of ALS., symptoms start from swallowing and speaking difficulties (caused by muscle weakening on area) before experiencing issues in muscle function and strength. (Atula, 2023)

ALS clients often come for respiratory physiotherapy. Breathing out is a necessary part of producing speech. As the ALS gets diagnosed, the communication tools might feel distant but still it is easier to learn to acknowledge the devices when still having good communication abilities. AAC tool which clients having amyotrophic lateral sclerosis use when muscle strength and speech atrophy can be communication devices with eye-pilot or devices which make speaking voice louder. These can be used flexibly for example during rehabilitation. (Haapsaari et al., 2021)

5.6 Cerebral palsy

Cerebral palsy (CP) stands as the primary contributor to physical disabilities among children. The management of CP is further categorized into three aspects: medical intervention, therapeutic approaches, and orthopedic care. (Cifu, 2020) Physiotherapy for clients with cerebral palsy often focuses on enhancing motor skills and halting the progression of movement issues. It can include exercises, heat therapy, massage, and finding and evaluating specialized equipment to promote independence in children with cerebral palsy. This therapy offers various advantages, including improved mobility and the prevention of potential problems like contractures and joint dislocations. This is achieved by maintaining strength and flexibility and boosting self-sufficiency among children with CP. (Proctor, 2023)

According to research findings, when children with cerebral palsy (CP) grow up, they tend to engage in fewer social activities and experience greater social isolation compared to their typically developing peers. It has been observed that social participation plays a vital role in enhancing the life satisfaction of children and adolescents with cerebral palsy, aiding in the development of their self-esteem, fostering the formation of social connections, and facilitating the acquisition of skills crucial for their physical and emotional well-being. (Septhon, 2020) Cerebral palsy can lead to challenges in sensory and cognitive growth, alongside motor difficulties.

These issues can impact the development of speech, language, and communication in children. It may result in reduced clarity in children's speech, gestures, and non-verbal communication through body language, while also causing delays in their language comprehension and expression. (Pennington, 2008)

5.7 Dementia

Dementia is an umbrella term for multiple different diseases which effect on cognitive functions, thinking, remembering, and reasoning which additionally can lead to speech problems. Challenges in speech can make the communication more difficult for both, the patient, and the health care professional. Any aged people can have dementia, but it is more common on elderly, geriatric patients. (Larrazabal, n.p.d.) Dementia is a progressive disease that has effect on active daily living and social interaction. (Friedman et al., 2010)

With clients having dementia, the physiotherapist can for example plan exercise programmes to improve life quality and to slow down the decline of functional abilities. (Emmady et al., 2022) According to Friedman et al.'s study (2010), older clients with dementia are more likely to get hip fractures compared to cognitively intact elderly. Clients with dementia diseases often also tend to have shorter gait stride length and slower walking speed. Clients with fractures and gait issues often tend to require at least some physiotherapy to keep up the functionality in activities.

With speech, dementia can cause multiple different issues depending on the type of their disease. The patients might not find the right words or use longer description for simple words (example: a book could be described f.ex. "as papers with stories" or a coffee cup as "a thing that you can put coffee into and drink"). These patients might also have difficulties understanding or they can get lost in the middle of conversation. Because of the wide variety of types of dementia, there is no one speech supportive technique that would fit every patient. Some might benefit on using non-technical approaches, such as body language and facial expressions, when some might benefit more on low technical options, such as drawing or writing. (Larrazabal, n.p.d.)

With elderly dementia clients, it is often more successful to use low-tech (non-electrical) approaches to support communication than using high-tech devices. Clients with dementia might benefit from visible notes and communication tools such as signs, color codes, communication boards and timers. (Bourgeois et al., 2010)

When communicating with clients having dementia, it is important for the physiotherapist to speak slowly and clearly (speech can be supported with AAC tools such as pictures), give enough time to respond, whichever the way of responding is and to encourage the client to continue communicating even if they would have had more ways of communicating earlier in life. The loss of words and speech can be scary or make the clients feel uncomfortable, which makes the role of health care professionals encouraging them even more important. Keeping the environment quiet and minimizing the distractions might often help the communication. When verbal communication abates, it becomes crucial to observe the client's facial expressions and body language more precisely. (NHS, 2022)

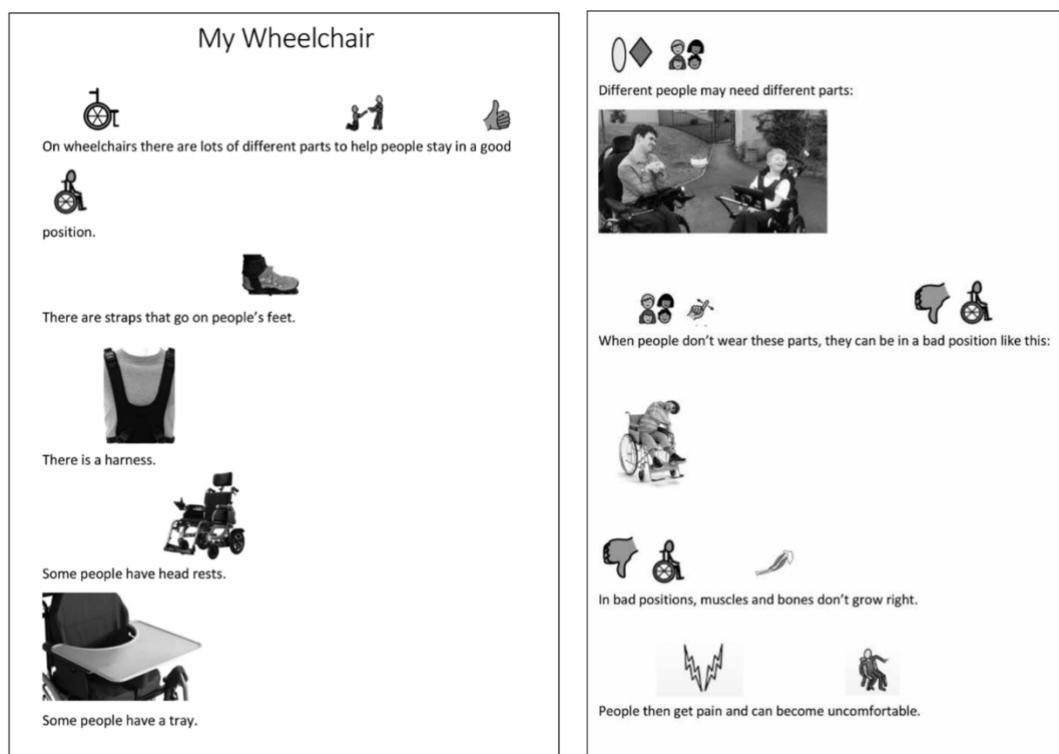
6 PRACTICAL USE IN PHYSIOTHERAPY

The most important point to remember about AAC is that the need of communication does not disappear or stop when communicating by speech is not possible. Getting the AAC tool to use is helpful for all participants in communication. (Haapsaari et. al, 2021) Physiotherapist can encounter diverse challenges throughout their professional career with patients who have difficulties in their communication.

If a physiotherapist meets a client, who might benefit from AAC tools or devices, it is important to tell the client about communication possibilities and to forward them to a AAC or speech professional to have their communication assessed more thoroughly. It is the client's right to be able to communicate and to take part into for example care planning and decision making. (Kuuloliitto, n.d.)

All the tools and devices introduced in this thesis can be adapted to work in communication during physiotherapy. Most important issues to keep in mind are, as

mentioned earlier, the suitability of the exact communication tool for the client and professionals having enough knowledge and technical skills to communicate with their clients using AAC devices. Tools and devices are all adjusted for the client, so there is not one right alternative which would suit all communicators. On the picture below, there is text-supported communication board about wheelchair adjustments for users. It gives a physiotherapy-related example on how professionals such as physiotherapists can adapt the AAC tools to work on situations such as client education about assistive device assessments.



Picture 5: My Wheelchair, Source: Speech therapist Francesca Septhon, Communication Matters, 2020 https://www.communicationmatters.org.uk/wp-content/uploads/2020/06/cmj_vol_34_no_1.pdf

On Bortagarai and Ramos' (2013) study about how physiotherapists use AAC with patients they noted that all of the physiotherapists interviewed said that they know and comprehend the importance of AAC in client communication, but none of them said to have enough theoretical knowledge about the methods. They told that with at least their patients the presence of speech therapist in the beginning of rehabilitation has been beneficial to get the AAC tools to use on physiotherapy sessions. All of them

note that they would want to use AAC with some clients if they would know how to adjust the tools to physiotherapy use. (Bortagarai and Ramos, 2013)

7 TRIAL FOR THE SELF-STUDY MATERIAL AND STUDENT FEEDBACK

The self-study material on Moodle H5P-platform was in the end of the process tested on two students from each study year, except from the group that had started their studies in the same autumn. On the time of the trial the students had studied physiotherapy 1, 2, 3 and 4 years. The total amount of students going through the trial was 8. Each student who studied through the material, was able to give unidentified feedback through online survey (Google Forms). The answers were not categorized according to the study year to keep on the possibility to answer without author recognizing them.

There were some technical problems with students being able to access the self-study material. Therefore, the trial of 2 students was done with the account of the author and for a few students the material was sent as a PDF. The students who tested the Moodle version, were satisfied about how it worked.

One multiple answer question was erased from the self-study material after the piloting, after 2 of the students found it unclear. The length or duration to go through the material seemed good according to the feedback. Only one student said that it could have been a bit less informative and more practical. Some grammar mistakes were corrected after the trial based on the feedback. Overall, the study-material seemed suitable for all the students in different point of their studies.

8 THESIS PROCESS AND METHODS

For the author the topic of Augmentative and alternative communication in physiotherapy came up from personal experience about using AAC during clinical practice and having to do independent studying related to topic. After noticing that AAC was something what the physiotherapy curriculum did not include so thoroughly, the author thought that it would be beneficial for any student to learn the AAC basics already during the studies. The process started with finding enough evidence-based knowledge on topic and finding the connections between physiotherapy and AAC.

This thesis was made to support the communicational knowledge of physiotherapy students. It was decided that the self-study material was not straightly connected to any course in physiotherapy curriculum, as the curriculum was about to change during the timeline of this thesis process. Inclusion criteria were preferred publish year 2015-2023 and older only if no newer articles were found and publication language either english or finnish. First the inclusion criteria was to have english articles, but since I wanted to include the processes and situation in Finland, finnish articles had to be included. Exclusion criteria for articles was if they were old and newer alternatives were available, if the publication language was other than finnish or english and if the articles were not reliable.

The self-study material was at first planned to be printable but by the recommendation of the thesis supervisor, H5P-platform on Moodle was chosen because of its accessibility and usability. The material in study material and thesis is the same, excluding some of the studies behind the theory which were only introduced in thesis.

The trial of the study material was focusing on if the content is suitable for students on all stages of studies and if the content is giving them new, useful, and motivating learnings. The trial process did not go as planned with technical problems with Moodle platform access, but 8 students were able to test the material and give feedback.

9 DISCUSSION

After making the final decision about the topic, the author started gathering the information. At first it felt difficult to find the area where to focus on. The author would have wanted to make the self-study material a bit more practical, but while containing the theory to study material, it was more difficult than it first seemed to make the learning process of the reader more practical. Therefore, the author turned their focus more towards giving a good base overall theoretical knowledge of AAC in physiotherapy to the students.

In the beginning of the process the author thought that there is a lot of studies and evidence about AAC used in physiotherapy, but while reading and researching more, it came clear that not a lot of deeper AAC knowledge is planted on physiotherapy field. As the process got further, it seemed like physiotherapy is somehow on peoples mind close enough to occupational – and speech therapy that physiotherapists have not had to have so deep AAC knowledge. Many studies proved this thought wrong, good communication is needed to provide sustainable, trustworthy, and professional physiotherapy practice. Hopefully now that devices develop and become more common, the knowledge of AAC comes more popular also in physiotherapy.

It was noted that physiotherapists understand the need of AAC, would like to use it, but do not in every situation know how. But the trend is rising and at the same time when the knowledge and recognition get better, also practical AAC use in physiotherapy does. The author hopes that this self-study material helps future physiotherapists to have at least some base knowledge of AAC and how to use it when starting their professional careers.

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Cboard. (n.d.) <https://www.cboard.io/> Picture 3: smartphone and mac