



JÖNKÖPING UNIVERSITY
School of Health and Welfare

Individuals' Experienced Osteoarthritis-associated Pain & Function while using a Knee Brace

A Qualitative Study

Bachelor Thesis, 15 hp

MAIN AREA: *Prosthetics & Orthotics*

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Summary

Background: Osteoarthritis of the knee is a condition that can emerge without any known reason, though most commonly it is caused by previous damage to the anatomical structures inside the joint. The most common symptom is pain during rest and activity. Individuals diagnosed with osteoarthritis often experience difficulties with performing certain types of movements and activities due to pain. **Aim:** Based upon a qualitative inductive content analysis, the aim is to investigate on a subjective level how individuals diagnosed with medial osteoarthritis experience pain and function, in relation to brace usage. **Method:** This study is based on recorded semi structured open-ended interviews with three individuals diagnosed with medial osteoarthritis whom uses a knee brace or knee orthosis. **Results:** The study generated six sub-categories which created two main categories describing the experience of medial osteoarthritis by the individuals. The results showed experience of affected physical ability and adaptation to pain. **Conclusion:** Individuals diagnosed with medial osteoarthritis experience limitation in activity and ADL mostly due to pain, though decreased function of the knee joint seems to be a contributing factor to limitation as well. Using a knee brace eases pain to some degree and enable individuals to perform some activities in comparison to when not using a knee brace. These conclusions should be considered with caution since the number of individuals interviewed in this study is small and may not provide the same information as of a larger number of individuals with medial osteoarthritis.

Keywords: osteoarthritis of the knee, knee brace, orthoses, pain relief, function.

Sammanfattning

Upplevd smärta och funktion vid användning av knäortos hos individer med osteoartrit.

- En kvalitativ studie

Bakgrund: Osteoartrit i knäleden är en åkomma som kan uppstå utan känd anledning, men vanligast är att det uppstår efter trauma och tidigare skador på knäledens anatomiska strukturer. Det allra vanligaste symptomen är smärta vid vila och aktivitet. Det här kan leda till att individer som är diagnostiserade med osteoartrit på grund av smärta upplever svårigheter med att genomföra vissa typer av rörelser och aktiviteter. **Syfte:** Baserat på kvalitativ induktiv innehållsanalys, undersöka på en subjektiv nivå hur individer diagnostiserade med medial osteoartrit i knäleden upplever smärta och funktion i relation till att använda knäortos. **Metod:** Studien är baserad på semistrukturerade kvalitativa intervjuer som spelades in med tre deltagare som använder knäortos som behandlingsalternativ för osteoartrit i knäleden. **Resultat:** Studien resulterade i sex stycken underkategorier som formade två huvudkategorier som beskrev individernas erfarenheter av medial osteoartrit. Resultatet visar erfarenhet av påverkad fysisk förmåga och anpassning till smärta. **Slutsats:** Individer diagnostiserade med medial osteoartrit upplever begränsningar i aktivitet och ADL mest på grund av smärta, men en bidragande faktor tycks också vara nedsatt funktion i knäleden. Genom att använda en knäortos lindras smärta något och möjliggör viss aktivitet som upplevs svår utan knäortos. Att ta hänsyn till med denna slutsats är det låga antalet intervjuade individer som kanske inte speglar samma resultat som i ett större antal individer med medial osteoartrit.

Nyckelord: gonartros, knäortos, ortos, smärtlindrande, funktion.

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Introduction

One of the ten most disabling disorders in developed countries is osteoarthritis (OA) (WHO, 2019b). In Sweden the prevalence of osteoarthritis is increasing in the population each year due to rising longevity and obesity. In the population aged 45 and above it is predicted that in the year of 2032, one out of three individuals will be diagnosed with osteoarthritis (Turkiewicz, 2016).

Osteoarthritis of the knee is a common but non-dangerous condition where function of the knee successfully decreases due to degeneration of cartilage in the tibiofemoral compartment (Lindgren & Svensson, 2014). A major consequence of osteoarthritis of the knee is individuals' often experience a great spectrum of discomfort and pain due to the structural changes of the knee. The degeneration of cartilage in the knee joint can not be restored, and the symptoms associated to the condition can only be decreased. Though, there are several different treatment options for decreasing the symptoms. Orthotic devices such as knee braces or knee orthoses are one option for treatment (Anthony & Wetherbee, 2013). Knee braces and orthoses have the purpose of maintaining or improve function in individuals' with impairment, through this the well-being of an individual can be increased and risks of auditioning health issues can be decreased (WHO, 2019a).

In this study a qualitative inductive content analysis of interviews with individuals diagnosed with medial osteoarthritis has been made, to describe experienced knee pain and function on a subjective level. The data was collected in areas near Jönköping, Sweden.

Literature review

The knee joint & osteoarthritis of the knee

Articulatio genus, the knee joint, is the largest joint in the human body (Bojsen-Möller, Trantum-Jensen, & Simonsen, 2014). It connects femur and tibia with the patella, and the joint is surrounded by a joint capsule. All surfaces inside the joint is covered by cartilage to reduce the load put on the joint, the cartilage covering the distal end of femur and the proximal end of tibia distributes the load to larger surfaces and is called menisci. Inside the knee joint there are also four ligaments and these structures together with the muscles surrounding the knee, are the structures that stabilizes the joint and prevent femur and tibia to slide. It is well known that the knee joint is put under large forces and stresses, this because of its location between long levers that makes the deforming forces large. Therefore, the knee joint is sensitive to injuries and pathological changes of the structures surrounding the knee and inside the knee (Bojsen-Möller et al., 2014).

Osteoarthritis of the knee joint is one of the most common joint diseases and is most often caused by previous injuries of the structures of the joint or deformity of the joint. Though it can also be caused

without any known cause (Lindgren & Svensson, 2014). The condition is not dangerous, but it develops over time and causes symptoms that can cause pain and discomfort (Anthony & Wetherbee, 2013). OA in the knee affect and break down the cartilage covering the surfaces of the joint. The main symptom is pain during activity and rest, but there can also be fluid or swelling around the joint and instability and deformity of the joint. Deformities are caused by degradation of the cartilage, leading to reduced tibiofemoral compartment. If the cartilage is most affected on the medial side of the joint the knee will be positioned in varus, while valgus positioning will be the result of lateral cartilage degradation (Anthony & Wetherbee, 2013). Anatomically the knee is often positioned in a light valgus position about 5°, if the angle is smaller or larger than 5° it is defined as varus and valgus (Bojsen-Möller et al., 2014).

Limitation in mobility, function and quality of life (QoL) is often associated with OA in the knee joint (Jones, Covey, & Sineath, 2015). There are several interventions that can be made to improve the symptoms of pain that comes with OA, the most important is nonsurgical: physiotherapy and exercise. By maintaining active there comes several positive effects decreasing pain, and also preventing excessive weight which affects osteoarthritis-related pain negatively (Jones et al., 2015). As mentioned earlier persons with OA often experience pain both while resting and while exercise and performing daily tasks. This because of the degradation of cartilage inside the joint, leading to valgus and varus which causes uneven distribution of the forces and load put on the joint (Anthony & Wetherbee, 2013). A non-surgical intervention to restore the tibiofemoral compartment and unburden medial or lateral compartment is braces and orthoses (Schmalz, Knopf, Drewitz, & Blumentritt, 2010). Some studies show benefits with using braces and orthoses for medial OA (Jones et al., 2015). There are also studies made where participants self-assessments showed experience of reduced pain while using brace or orthosis (Pagani, Böhle, Potthast, & Brüggemann, 2010).

There are different kinds of knee braces and orthoses, for OA functional knee braces, prophylactic knee orthosis and unloader knee braces could be used. The purpose of these braces are to reduce pain through providing biomechanical stability and restore the tibiofemoral compartment by decreasing the compressive forces (Anthony & Wetherbee, 2013).

Orthosis principals

The principals of the systems that control an orthosis physical function is:

1. $Pressure = \frac{Force}{Area}$
2. $Torque = Force \times Distance$
3. *Control of direction of primary force, and direction of counter forces*
4. $Equilibrium \sum_{forces} = 0$

These four principals of physics make up the biomechanical attributes of orthosis design. These are needed when for an example, designing an unloader knee brace. Allowing following:

- Maximize stance phase capabilities

- Minimize or eliminate abnormal alignment of anatomical segments
- Minimally compromise swing clearance
- Effective pre-position of the limb for initial contact (IC)
- Energy efficacy, decreasing energy expenditure (Lusardi, 2013)

There are also other questions to consider, for example terms of comfort. Whether the orthosis can be worn for a longer period of time without risk of skin damage, or easily be donned and doffed regarding clothing, footwear and toilet visits.

1. The 3-point equilibrium force system is utilized to correct, while assisting a segment. Making *Equilibrium* $\sum_{forces} = 0$, which means that to fix a segment or a joint in a certain position in relation to terms of varus, valgus, flexion, extension and inversion. These changes may be necessary to stimulate or restrict motion, depending on pathology of the individual and treatment plan. It also depends on body structure, function, activity level and participation level. All in relation to the categories in the ICF- model (Jarl & Ramstrand, 2017) for orthosis prescription (Lusardi, 2013).

The anatomical domains that rule orthotic prescription is:

- Joint integrity and stability
- Range of Motion (ROM)
- Limb length and alignment
- Muscle length
- Overall flexibility
- Motor control and muscle tone

There are many different types of orthosis for knee dysfunction, some are simple neoprene sleeves that aims to decrease knee pain, other are for example an unloader brace (Anthony & Wetherbee, 2013). These apply the 3-point equilibrium forces to unload the medial or lateral compartment by increasing condylar separation (Dennis et al., 2006).

Knee orthosis type	Function	Anatomical constructs
<i>Functional knee orthosis</i>	Additional protection as rehabilitation is completed	Whole knee, minimize Varus/valgus motion
<i>Prophylactic knee orthosis</i>	Prevent or lessen injury	Patella fractures, ligament destruction
<i>Unloader knee brace</i>	Dissipate increased varus/valgus	Tibiofemoral compartment

Table 1 show the function and attributes of different types of knee orthoses (Anthony & Wetherbee, 2013).

Previous studies and the arguments behind a qualitative study

There are previous studies that look at OA of the knee, for evaluating different methods of treatment and the reliability of methods for treatment. Some studies look at for example the condylar separation angle on medial compartment OA of the knee, and what implications increased angle of the medial compartment may have on gait (Dennis et al., 2006; Ramsey & Russell, 2009). Findings show evidence of that an unloader brace, that off-load the medial compartment of the knee, can provide pain relieving effects. This by separating the condylar area under heel-strike and mid-stance. Although there is no evidence that all different types of braces are as effective in terms of OA and pain relief (Dennis et al., 2006).

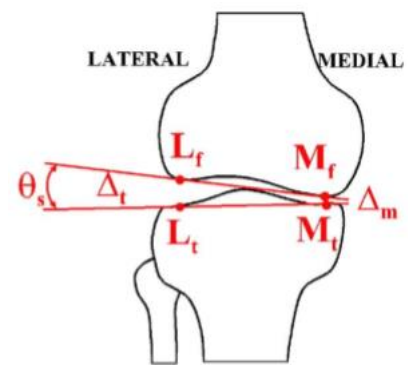


Figure 1 show the anatomy and decreased angle of a knee with OA on the medial side (Dennis, Komistek, Nadaud, & Mahfouz, 2006).

The effects of an unloading brace in treatment of pain and function for individuals with OA of the knee have also been studied by Thoumie et al. (2018). The study design was a ROTOR, randomized clinical trial. This type of study design has a high validity level (Hafner, 2008). The conclusion from the study showed that with bracing in combination with analgesics, therapeutic training and gait training was helpful for individuals with medial OA of the knee. The pain decreased and the function of the individual increased. Though, authors and researchers encourage further studies and clinical trials are required for further evidence (Thoumie et al., 2018).

A study conducted through a questionnaire by phone investigated long-term results of brace usage on individuals with OA of the knee (Wilson, Rankin, & Barnes, 2011). The aim of the study was to evaluate and to determine the status of individuals brace. This because even though some individuals experienced positive effects of using knee brace, still opted surgical intervention after only 2.7 years. The conclusion was inconclusive, and the researchers were unsure of which factors led to patients undergo arthroplasty. One hypothesis was that the individuals with greater deformities caused by the OA, had only chosen the brace as a product to extend the time before the surgery (Wilson et al., 2011).

Qualitative studies performed to investigate the experience of brace usage with diagnosed OA on databases such as Medline and Pubmed was found to not give any results. Which is surprising since OA is such a common diagnosis, and part of finding effective treatments and plans of treatment it is important to evaluate individuals subjective experience of pain and function that is related to OA. Raising this subject by investigate questions such as:

- Perceived feeling about the condition
- Decreased function and management in one's everyday life
- Environmental factors effecting osteoarthritis-associated pain and function. How does these factors correlate?
- What challenges individuals diagnosed with OA?

- Pain management and self-image
- Participation in activities and in society
- Which are the strategies to deal with the disorder?

For prosthetists and orthotists, this subject is interesting because of the in-depth knowledge one can obtain from a patient clinical meeting (Pathak, Jena, & Kalra, 2013). Knowledge about individuals' subjective experiences could help and provide knowledge about how individuals react and deal with pain and difficulties on a person level. For instance, results for brace usage showing positive effects on a personal level for some individuals could be implicated to other individuals with similar condition and problems.

Qualitative research can have an impact and contribute to health research about OA. In a clinical frame, qualitative research can rise new insights and solutions to treatment methods. In addition, participants in qualitative studies have an active role in the study and have an individual voice (Pathak et al., 2013). Which could give individuals included in a qualitative research an enhanced and empowering experience of treatment.. In a qualitative study the relationship between the researcher and participating individual is less formal and more relaxed, which makes room for self-critical thinking and reflection for the participant.

Aim

Based upon a qualitative inductive content analysis, the aim is to investigate on a subjective level how individuals diagnosed with medial osteoarthritis experience pain and function, in relation to brace usage.

Methods

Study design

The method for research and collecting data in this study is within a qualitative frame. Data collection is made by open-ended interviews with questions of different nature such as, descriptive narrative and evaluative (Gery W., 2001, pp. 1-2).

The method chosen is utilized by the qualitative research areas of qualitative content analysis with an inductive approach (Granskär & Höglund-Nielsen, 2008, p. 160). Inductive approach was chosen to analyze the interviews in an unbiased manner to describe for example feelings, experiences and expectations of OA and brace usage by the interviewees. The qualitative approach is built on the uttering of *“the truth lies in the beholders eye”*, this meaning to subjectively describe complex, context-dependent, constructed information. This aforementioned information paves the way for a nuanced interview where the individual’s narratives are studied with the knowledge of their personal history, life quality and their current culture (Granskär & Höglund-Nielsen, 2008, p. 160). Therefore, the focus in this qualitative content analysis lies in describing variations through identifying differences and similarities in the content of text based on the interviews. This allows the possibility to define the differences and similarities within the chosen aim (Granskär & Höglund-Nielsen, 2008). An alternative approach was discussed by the authors and the supervisor. Phenomenological study could have been an alternative approach, which has many similarities to the present method. Why the inductive method was chosen is motivated by the studied phenomenon was discussed and concluded to be not specific enough for a phenomenological approach.

Recruitment and inclusion criteria

Participating individuals was recruited through contact with prosthetic and orthotic clinics (P&O clinics) located near Jönköping, Sweden. Individuals working at P&O clinics selected the participants suitable the inclusion criteria’s set for the study. These criteria were set to include both men and women with full cognitive function and diagnosed with OA of the knee. Participants with unilaterally and bilaterally medial compartment were accepted. Another criteria set was that the participants have had an acclimation period of minimum 3 weeks for usage of brace or orthosis. Participants who have had surgical intervention of arthroplasty of knee after using a knee brace was excluded.

Three individuals, all treated at a P&O clinic for OA of the knee, fulfilled the above-mentioned inclusion criteria set for the study.

Ethical considerations

Before conducting the study, the authors and the supervisor signed and approved an ethical considerations form.

In consideration of this ethical form and ethical aspects, authors developed a written consent form provided to all participants before interview started. This to inform and ensure understanding about participants purpose of participation (Vetenskapsrådet, 2002). Participants was informed that they have possibility to withdraw participation in the study at any time, chose not to answer questions during the interview and that their identity and answers would be kept anonymous. Other information given to all the individuals' participating before the interview started was the aim of the study (Vetenskapsrådet, 2002). The written consent was signed by both participant and authors before interview started.

All communication with the participants was made in Swedish and the consent form was written in Swedish. The participants and information presented in this study was collected in a secure manner and treated confidentially. None of the participants was subjected to any risk of mental or physical harm (Vetenskapsrådet, 2002).

Material

The material used in the data collection:

- Question form (See Appendix 1)
- Notebook
- Cellphone used as recording device
- Signed consent form

Data collection

Prior to the data collection, the authors in addition to the consent form also designed a question form of open-ended questions (see Appendix 1) in Swedish with questions of different nature based on the description of Gery W. (2001). The questions were designed to be open-ended and not leading so that the individual being interviewed remain in control of his or her own sayings. The different natures of the questions were meant to lead to personalized and open-ended responses from the interviewees. The questions were not pilot tested but discussed with the supervisor before the interviews. The authors rehearsed the method and the question form and was well prepared before performing the interviews.

The data was collected through three separate interviews between April and June 2019. A group of three participants is a small sample, though chosen to be acceptable in consideration of limited time and the authors previous experience of qualitative research. Contact with the participants was made by phone only after an individual working at the P&O clinic had contacted and informed participants and forwarded contact information to the authors. One of the authors has Swedish as mother tongue and was there for the interviewer making contact with participants by phone and had the predetermined role of leading all of the interviews. The other author has significant understanding of the Swedish language but has Arabic as native language and speak Danish. This author would during the interviews focus on follow-up

questions and take notes. Notes of things such as participants mood and answers seen as particularly relevant for the study. Before setting a time and place for the interviews, the authors presented the aim of the study and informed how the interview would be performed and asked for individuals' interest in participating. The time and setting for each interview were set in agreement with the authors by the individual being interviewed. By letting the interviewee decide time and place authors believed the individual would feel secure and relaxed. Each interview started with the authors introducing themselves and the participant was verbally given information about the aim of the study and the consequence of participating and with a written consent form were agreed upon and signed by the authors and all participants. The interviewees were informed to feel free to answer the questions in their own pace and by their own interpretation, also that questions could be repeated if unclear or chosen to not be answered. Before the interviews started the cellphone used as recording device was presented and placed visibly on the table but with screen lock to be discrete and not disturbing object. After this procedure the interview started, and all interviews lasted around 19-26 minutes. All interviews ended with interviewees was free to add information or asking questions before recording stopped and the interview was completed.

All three interviews were semi-structured, meaning all questions on the question form was asked but dependent on the interviewees answer and not in the exact order of the question form.

Analyzing the data

The collected data were analyzed through transcription of the recorded interviews according to the qualitative inductive theory. The recordings and transcript interviews were listened to and read several times by both authors to eliminate inconsistencies and errors. The authors both listened through the recorded material and transcribed the recordings and took part of each other's collected material, this to reduce risk of possible mistakes of missed data and errors through language barriers because of one author not speaking fluent Swedish. After this process the transcripts was analyzed through qualitative content analysis to meaning-bearing units and codes that described the content of the meaningful unit. Sub-categories were formed by codes with comparable value and the sub-categories were translated into main categories and a theme.

Results

Included in the study was three participants, one woman and two males in the ages of 51-65 years. The participants had by the time of the interviews had symptoms of the disorder between 15-25 years, and all of them have been using a knee brace for more than the three-week acclimatization period set as inclusion criteria for the study.

The qualitative data resulted in sub-categories, main categories and a single theme (see Table 2). The theme developed from two main categories that was created from sub-categories and represents the underlying meaning of the qualitative data.

THEME	Brace usage and coping with difficulties caused by medial OA of the knee					
MAIN CATEGORY	Physical ability				Adaptation to pain	
SUB-CATEGORY	Duration of disorder	Limitation in activity	Ability to work	Secondary problems	Insecurity	Acceptance

Table 2 shows the resulting sub-categories, main categories and the theme.

Physical ability

The physical ability due to the disorder of OA experienced by the interviewees, is dependent on several different factors. One significant factor for the physical ability of the participants was the duration of disorder, meaning for the period of time between symptoms emerging and the situation today.

Participants described time significant for learning how to avoid and ease discomfort caused by certain movements and activities. Though, the duration of time with symptoms have also resulted in limitations in activity, affected the ability to work and secondary problems.

Duration of disorder

The participants have all had the disorder OA of the knee for more than ten years and explained that the symptoms of the disorder began with minor problems and discomfort. In the beginning it appeared in for example minor ache or pain during a certain movement or activity, and later the aches and pains have increased. In a longtime perspective the amount of discomfort such as ache and pain have varied and affected the physical ability.

'... det började för en 25 år sen... och sen dess har det varit problem till och från... Mer eller mindre.'

'Det kom lite smygande värk vid ansträngning och belastning... och det är kanske nästan 15 år sedan ungefär... Och sen var det lite mer akut för drygt 10 år sedan.'

'... Hade svårt att gå ordentligt, det kom ju ganska snabbt. Sen gick det där över faktiskt och det blev mer stabilt... det har varit perioder med smärtor... sedan dess smärta som jag känner i varje steg.'

'... då hade jag ju ont nästan dygnet runt, i viloläge hade jag ont och vad jag än gjorde så hade jag ont nästan hela tiden.'

'... då fick jag väldigt ont under några veckor och hade svårt att ta mig fram...'

'... jag har haft ont till och från.'

'Just nu har jag också ont i knät.'

'... smärtorna kommer i senare år. Det har ökat ännu mer de senaste åren.'

Limitations in activity

Participants described varying symptoms of increased function of the knee, causes limitation in movements by for example stiffness and instability.

'Det är svårt att röra knät.'

'... man blir ju ganska instabil, till exempel man känner sig vacklig...'

'... så fort du stiger lite snett, ojämn mark eller någonting, då hugger det till extra mycket...'

Another factor contributing to limitation in movements and activity mentioned by all participants was pain.

'Ja, har man smärta blir man begränsad per automatik.'

All participants also have families, and all of the participants described the importance of being able to maintain mobile without experiencing pain and discomfort to be able to perform tasks at home and spend time together with family members. By experiencing pain from time to time due to the disorder participants felt limitation in activity of daily life.

'... ta på mig strumpor, och byxor och kalsonger kan vara problem för jag kan inte få upp det benet lika högt upp...'

'... ta på strumporna och skor kan ibland vara svårt då jag blir stel i knät. Det har jag inte ens tänkt på förrän nu.'

'... saker som att kliva upp på en stol för att nå saker placerade i skåp. Lägga mig på knä när jag måste ner på golvet... dom saker är problematiska.'

'... kan inte ligga ner och rensa ogräs i trädgården längre...'

'... när jag ska in och ut ur bilen och gå i trappor och nedförsbackar och uppförsbackar... då är det lite problem.'

'När man är ute och går med andra och sådär kanske och känner att nej nu får de ta och vänta för jag kommer inte ner för backen lika snabbt...'

The participants are all active individuals with interests of being outdoors taking long walks and other physical activities such as going to the gym, golfing, ice skating and hiking. Participants also described riding a bike to be difficult from time to time, and for some this is an important form of exercise and transportation.

'... det är svårt att åka skridskor ibland... Och sen har jag svårt att cykla ibland också nu.'

'Jag vill ju ut och springa också men det går ju inte nu... det kunde jag förut.'

'... jag kan inte lägga på knä längre eller jag kan ju göra det men det gör ont...'

Participants described that activities must be adjusted by level and duration of activity, otherwise discomfort and pain will occur.

'... ibland någon natt sådär när man ansträngt sig mycket och märker att åh, nu somnar jag inte för jag känner att det smärta...'

Ability to work

None of the participants interviewed has retired yet, and all of them have jobs requiring different amount of physical ability. All participants described being able to work as an essential factor of everyday life, contributing to society and their family but also for personal reasons. Not all participants felt direct limitation in work tasks, but all of them implied difficulties going to work and performing tasks and such at work from the decreased function of the knee and pain.

'... sitter jag i en bil för länge, då kan jag få ont...'

'Jag jobbar ju hemma. Lyfter tunga saker på gården och sådär och då får jag ont...'

One participant had experienced knee pain from the disorder to the extent of not being able to work for a while.

'... var tvungen att vara hemma sjukskriven då...'

Secondary problems

Secondary problems originating from having the disorder of OA was another factor leading to limitation in physical ability mentioned by all of the participants. All participants were aware of that with time the symptoms of the disorder could be deepening, not only by the wear of the surface inside the knee joint but also by consequences from aging, decreased exercise and gaining weight.

'Jag är ju inte 20 år längre heller...'

'... man är ju inte lika smidig... nu har jag ju gått upp några kilon.'

'Jag väger några kilo mer än förut.'

All participants expressed their desire to be able to stay active not just to be able to work and continue with active activities. But, also since the disorder of OA is a disorder that will be helped by resting.

'Det sas ju från början och det vet jag ju, att stillhet och att inte röra på sig hjälper inte.'

To be able to stay active all participants described that they often shifted the load on the hurting knee to the other leg, and this have led to secondary problems of back pain, or strain on the hip and the groin area and excessive load on the other knee.

'...belastar mindre för att känna mindre ont och belastar andra sidan och så där istället.'

'... jag har haft problem med ryggen i många herrans år...'

'... och nu har jag även fått problem med ljumskarna på sista tiden på grund av att jag belastar fel... Ljumskarna har blivit ett nästan större problem än knät nu.'

'I höften lite mer och sen känner jag ju lite i det andra knät....'

Participants also described periods of disturbed sleep related to pain in the knee. Pain would occur sometimes without known reason or after a day with heavy load on the knee, for example after exercising.

'Och sen har det varit i perioder smärtor nattetid... Så att jag inte kan sova.'

'... ibland har det varit jättesmärta på nätterna. Ibland inte.'

Disturbed sleep or days with excessive pain has for the participants affected the outcome of the next day and feelings of affected mental health. Participants also mentions tiredness from medicine prescribed to decrease pain. All of the participants have had to take pain killers at time to time to ease pain from the knee diagnosed with OA or for secondary problems of for example back pain.

'Det är lite jobbigt ibland, lite känsligt och jobbigt ibland och så. Att det gör ont.'

'... ibland får man ta smärtstillande också...'

'... tabletter gillar jag ju inte... dom undviker jag in i det sista för jag blir lite halv-flummig av dem... tar tabletterna och vill sen inte göra någonting alls då...'

'... tar jag inte tabletterna får jag ju ont, eller har mer ont då, och tar jag tabletter så blir jag lite bortdomnad i huvudet. Det gör ju ont men alltså i huvudet med allt mentalt...'

Adaptation to pain

All participants interviewed mentioned two important factors for coping with symptoms from the disorder, insecurity and acceptance. Insecurity of progression of the disorder and for how long pain would be manageable, and also insecurity in movements. Participants also mentioned adaptation to pain and accepting the problems and pain brought by the disorder was a large factor of coping.

Insecurity

All participants mentioned insecurity as a two-faced factor. They know that the development of the disorder is individual, and all have experienced more problems at certain periods and less in other periods. One side of the insecurity expressed is for how long the problems and pain would be manageable and how long it would be possible to avoid surgical intervention.

'... fick jag veta att det enda som de kunde hjälpa mig med nu är en totalprotes. Och ny knäled vill jag inte ha än.'

'... jag går och funderar på om jag ska operera mig eller inte... men jag tänker ju att jag ska operera mig... samtidigt som jag är fullt medveten om att en operation ska jag inte vänta med för länge heller och att en protes inte håller i hur många år som helst heller...'

The periods with pain were expressed to be difficult leading to insecurity in when pain will occur and to which degree of pain certain movements and activities will cause.

'... jag var rädd för att stiga snett och såna grejer och det kändes lite ostabilt om man säger så...'

All participants mentioned that insecurity in some activities such as long walks, provided stability and decreased insecurity.

'... ortosen håller det tillbaka så jag kan liksom vara trygg... Det blir på något sätt tryggare och stabilare i steget.'

'Så när jag är på väg ut och känner oj nu har jag glömt den så nu måste jag tillbaka och hämta den. För då känns det liksom bart eller svajigt. Men jag klarar att gå utan men det är en mental grej tror jag...'

'... det var stabilare, jag vågade mer om man säger så. Innan kanske man gick lite försiktigt och så utan...'

Participants described the brace to be helpful and an important device to support and decrease limitation in some activities.

'... det har ju hjälpt bra det knäskyddet...'

'... vi vandrade en hel dag upp på en brant och sen ner. Och hade jag inte haft den då så vet jag inte hur lång tid det hade tagit att gå ner för den där branten igen.'

'... ett viktigt hjälpmedel tycker jag.'

Acceptance

The participants described their experience of the condition of OA in the knee to be a disorder developing over the years with varying periods of troubles and pain, and therefore to be unpredictable in terms of when pain and limitation will occur. Even though brace usage has relived some pain and improved stability in movement the most important factor to manage pain and activity is the acceptance of the disorder and pain.

'... jag får bita ihop...'

'Sen vänjer man sig vid smärta, det här med att man alltid har ont i alla steg... man tänker inte på det så mycket till slut.'

'Det går inte att hjälpa... det är bara att gilla läget.'

Considering all participants described that after some time they have all accepted that pain will occur often and especially by certain movements. Participants all mentioned that pain is something they have

gotten used to, but they all have experienced some relief and help by being provided with a brace and learning to use the brace for activities where pain would occur without the brace or when a period of more symptoms is present.

'... jag använde det i början ett tag... med jag tyckte inte att det hjälpte så mycket när jag spelade... Men nu har jag börjat använda det igen lite grann när jag fått ännu mer problem...'

'Nej, jag behöver det inte i vardagen utan det är bara när jag anstränger mig.'

'... använder den bara när jag motionerar. Som när jag är ute och går långt till exempel.'

Two of the participants also mentioned the importance of accepting the disorder and being open about troubles and difficulties caused by the disorder to family and friends, this to increase understanding and participation in social activities.

'... jag är så öppen med att såhär är det, såna här problem har jag och det vet de flesta som jag umgås med.'

'...visst är det jobbigt... Det kan jag erkänna och det har jag sagt till andra man pratat med... Så jag har ju pratat med dem med hur det varit, lite mentalt och sånt där...'

Limitation and pain are parts of all the participants everyday life, but all participants have tried to adapt by and accept the challenges caused by the disorder, but all participants describe that pain is a struggle.

'... jag måste jobba eller idrotta eller cykla eller sånt där. Det vill jag ju göra. Jag kan inte bara sätta mig ner i en soffa liksom och vila bara för att jag har ont i knät... Så vill inte jag leva och kommer inte leva så heller.'

'... det går ju... Det är bara så, det måste gå.'

Discussion

Method discussion

Design of the study and recruitment method

This study sought to explain individuals experienced knee pain and function of medial osteoarthritis of the knee in relation to brace usage. To describe this on a subjective level a qualitative inductive content analysis was conducted. In this study, the authors recruited three participants through a P&O clinic in Jönköping, Sweden. Three participants are a low amount, though considered to be acceptable and the collected data from the participants had several similarities, which lead to questions of if a larger number of participants may have resulted in larger variation or depth of the data collected. For further studies it would be interesting to investigate data collected from a larger number of participants to see if the answers and collected data could provide more information in terms of pain and function experienced by individuals diagnosed with medial osteoarthritis.

Choosing an environment where the interviewee can feel relaxed is important for creating a neutral relationship between the participant and the authors (Trost, 2010). By creating a neutral relationship between the interviewer and the interviewee the authority figure of the interviewer decreases, which could lead to interviewee feeling more secure and relaxed (Pathak et al., 2013). The location for the interviews in this study was chosen by the participants. This for the ease and convenience of participants, and to give participants the opportunity to prepare for the meeting. Unfortunately, only two of the three interviews were conducted with both authors present, allowing the authors to only observe two of the three participants while conducting the interviews. The settings for two of the interviews was at cafés chosen by the participant nearby participants' home and in one case at the individual's workplace. Advantages with meeting at a café was that it is a neutral location where the individual can feel that no intrusion has been made on the personal sphere of home and had the freedom to choose where to sit. Disadvantages of the location noticed was that the cafés was at times noisy and disturbing (Trost, 2010). Though the noisy environment of the café was as mentioned before chosen by two of the individuals and considered to not be a problem since questions could be repeated when the noise was disturbing, and the individuals had plenty of time to answer questions or could choose to not answer question if felt inconvenienced to answer. The interview performed at one of the individuals work place had the advantage of being calm and undisturbed, and the setting was the individuals natural environment creating a less asymmetric relationship between the participant and the author (Trost, 2010).

Data collection

Because of the study being conducted in Sweden and all participants spoke Swedish, all communication between participants and authors was made in Swedish and no interpreter was needed. The plan was to have both authors present at all of the interviews for interpreting the interviewees, but at one of the interviews there was only one author present. The disadvantages of only having one author present to

conduct the interview is the lack of help with follow up questions, interpretation of the individual and such. This could have affected the collected data of the interview since both authors have little experience in performing qualitative interviews, and therefore generated not as rich data as if both authors would have been present (Guiliana & Baum, 2011). The authors experienced that when both authors sat down with the different interviewees, the atmosphere between all parties were relaxed and comfortable and the length and richness of the answers varied providing a great variety of quality and quantity of the interview. During the interview with only one author present the atmosphere between was also relaxed and generated a wide variety of quality and quantity, but the answers was not of the same character as in the other interviews meaning the dynamics of a third party could affect the interaction between present parties (Trost, 2010). Another factor that can affect the interviewee in an interview except for setting, interaction with interviewers and such is the fact that the interview was recorded and the knowledge of this might have led to discomfort (Trost, 2010). The conducted interviews were recorded with a cellphone placed on the table. All participants were informed both verbally and in the written consent form that the interview would be recorded with the cellphone. Why a cellphone was chosen as the recording instrument was because of it being a very simple and common device, used by almost everyone in today's society. Placing the cellphone on the table with the screen saver turned on, the device was barely noticeable, which authors thought would feel more natural for participants than talking into for example a Dictaphone. Recordings of the interviews were made to give authors the opportunity to be present and really listen to the individuals, while the cellphone captured the character of the conversation and expressions such as sighs and laughter. The recordings also provided the opportunity for the authors to listen through the interview afterwards for analyzation, reflection and improvement of performance in terms of interviewing. Another advantage of the recordings was since some of the participants had a pronounced dialect none of the authors are used to, the chance to understand the collected data better after listening to the recording and provide the opportunity for both authors to take part of all interviews since both were not present at one of the interviews. Even though the environment of the cafés sometimes was noisy all recordings had decent quality which is an advantage for analysis of collected data (Trost, 2010).

In an attempt to reach a higher level of reliability of the data collection, all the recordings were listened to by both of the present authors. As the language barrier, for the Danish author, possibly could have caused issues with the transcription, it was decided to let the Swedish author conduct the initial transcriptions, and secondary have the Danish author controlling them for mistakes, e.g. missed details or faults. This was a tactical measure and is considered by the authors to increase the reliability of the transcriptions. Preferably, both the authors should have participated in the initial transcriptions, but given the circumstances with language barriers, this solution was considered fully acceptable. After this, the authors partially performed the qualitative content analysis of the collected data together. The parts of data that were analyzed separately were then discussed between authors to find results of same or similar categories, codes and such. This for reaching a higher level of dependability of the analysis and agreement between authors that data included in the analysis is relevant. Challenges of performing a qualitative content analysis for authors is to not be biased by one's perspective, but to analyze the meaning of the text

from transcribed interviews. It is important to considerate the influence on the truth of the text made by the non-verbal expressions and such made by the individual.

Result discussion

The purpose of this study was to investigate the experience of pain and function in relation to brace usage in individuals diagnosed with osteoarthritis of the knee. The domains were chosen in order to get a broad perspective that the patients could relate to in a subjective setting including their own thought about living with the condition of osteoarthritis of the knee. The choices of domain are also built upon quantitative studies previously conducted in the field of researching pain, function and brace usage (Jones et al., 2015) and the tools to evaluate these clinical aspects (Parween, Shriram, Mohan, Dave, & Subburaj, 2019). The results in this study showed some similarities in terms of physical and mental conflicts and limitations in a day-to-day situation, and the results showed that pain and function is two halves of a whole.

The participants in this study all describe that they have experienced a decreasing physical ability due to the condition of osteoarthritis of the knee. The difficulties described as stiffness, decreased mobility and stability were factors contributing to decreased physical ability in both ADL and certain activities or movements. Another factor mentioned by the participants was their age. For a healthy individual, decreased mobility is common due to the change of physique that comes with aging. The participants in this study describes that the decreased mobility and limitation in certain activities appeared earlier in life than they would have expected, this because of the condition of their knee. Further have the condition and the deterioration of cartilage in the knee caused discomfort and pain leading to secondary problems in other body parts such as the hip or the other knee, either by having osteoarthritis in several joints in their body or by excessive loading after have shifting the load away from the hurting knee. The symptoms and difficulties described by the participants in this study are well-known and commonly appearing for individuals with the condition and also described in studies by Jones, Covey, & Sineath (2015) and Anthony & Wetherbee (2013). The results of the present study therefore support these already well-known findings, but with the perspective of a qualitative analysis rather than quantitative.

All of the participants were also aware of the importance of trying to keep active and exercise or do physical therapy as it is a recommended intervention to decrease problems (Jones et al., 2015) and to use their brace for unloading the tibiofemoral compartment for easing pain (Pagani et al., 2010). What came clear from the participants were that the expectations on the brace were high and that brace treatment did not fulfill the purpose of easing pain in all movements and activities. The participants explained troubles with walking uphill or stairs, running or other more high-level activities were also described troublesome both while not using the brace and while using the brace. The brace was experienced helpful only at times, for example during longer walks which rise questions of if there are possibly biomechanical issues with the brace designs. This since the biomechanical stability and restauration of the tibiofemoral compartment supposed to ease pain (Anthony & Wetherbee, 2013) seems to not be accomplished in all

activities and movements were individuals with medial osteoarthritis experience discomfort and pain, leading to experiencing limitation in ADL, activity, ability to work and such. Based on the answers from the participants, it seems to be a possibility that the brace is most effective in pain-relieving when in an upright walking position, but perhaps not as much in activities where the knee is in a flexed position, or when put under high strain, e.g. walking upstairs.

The participants in this study all expressed their thoughts of considering arthroplasty as treatment to increase their physical ability and ease pain. It is mentioned in studies that individuals chose to opt surgical intervention after have used a brace in only a period of 2.7 years (Wilson et al., 2011). The individuals in this study have all experienced difficulties caused by the condition for a period of 15-25 years and are now considering surgical intervention which may indicate that braces are only sufficient of pain relief to a certain degree. Though, surgical intervention may not be an option for all individuals suffering from osteoarthritis-related problems. Age or secondary illnesses such as cardiovascular diseases may be a risk factor for surgical intervention and therefore might not be suitable for some individuals. Then there is also the aspect of the life length on an arthroplasty knee, and the fact that individuals may prefer to post-pone a surgery for as long as possible. The present study has shown examples of individuals not keen to use analgesics. To be able to avoid analgesics and also postpone surgical intervention, conservative treatment could be an option for these individuals. However, as it seems that the effectiveness of the knee brace is limited in relieving pain caused by osteoarthritis, future research is needed to find either new effective knee orthosis designs, or answers of what is causing the knee brace designs available on the present market to work for some individuals but not for others.

The participants in this study all mention experiencing pain of varying degree for both long and short periods of time, and in some periods on a daily basis. To minimize the experienced pain all participants described to be aware of the National guidelines for treatment such as exercise and physiotherapy, brace usage and analgesics when needed (Socialstyrelsen, 2020). Though, the most important factors for pain management according to the participants seems to be acceptance of pain caused by the osteoarthritis. The participants described that after enduring pain for many years, the pain at times were less obvious even though they were experiencing pain. The participants described that experiencing periods of constant pain, would result in experiencing the pain as less high-level in comparison for the preliminary pain. All three participants described this feeling to be as if the pain would be sub-consciously tucked away, meaning the pain would still be present but the individual would not think about the pain as much. An example of this was told by one participant who mentioned putting on socks or underwear to be troublesome and when to think of it also painful, but this were not something the participant had reflected upon until asked about troublesome and pain causing situations in ADL. This suggest that individuals with osteoarthritis with time may develop a high threshold for pain and may not be limited or restricted by pain until reaching higher pain nuisances (Axelson, 2010). Why individuals with osteoarthritis experience the sense of having to accept and adapt to pain seems to have connections to the pain relief available from treatment by exercise, analgesics and braces that may not be as effective as hoped for by the individuals. Ineffectiveness of relieving pain causes individuals to having to endure pain for extensive periods of time

and therefore individuals cope with the pain by accepting that there will be pain present for periods and in certain activities, and it is just a fact to accept.

The pain seems to be dependent on if the individual is experiencing a period of increasing symptoms caused by the osteoarthritis or what kind of movement or activity the individual is performing. The participants also described that the pain would affect more negatively based on the level of pain and at what part of the day or by what activity or movement that caused the pain. To start a new day by waking up with stiffness and pain were told by the participants to have affects on the outlook of the day and the participants mindset. The participants described that by waking up with pain they would at times feel insecure about the ability to perform tasks at home or at work without having even more pain during the evening. This leading to both a physical and mental conflict, since the individual have a desire to be able to perform tasks at home and at work, participate in activities or exercise but maybe would feel unwilling to do so by feeling worried about it causing pain at the time of performance or later. As mentioned before participants also shared of trying to avoid pain in the knee by shifting the load to the other knee or such, which also causes a conflict of physical and mental character according to the individuals. This, because they all have started in later years to experience pain and secondary problems in other body parts.

The participants all described these different factors of adaptation to the experienced pain to be helpful in terms of pain management, but that it is also mentally tiering to experience pain in varying amount at different periods and to perform tasks and activities with pain on a day-to-day basis.

After studying the results of this study, it is also questioned if the pain and decreased function, affected physical ability and limitation in activity are aspects affecting the quality of life for the participants in this study. The information about osteoarthritis-associated pain and function given from the participants in this study though the interviews was interpreted by the authors to have some effect on the quality of life of the participants. There is a questionability to the ethics of treating patients with expensive braces that are not pain reliving enough for the individual to even perform simple tasks of ADL without experiencing pain. Due to participants having to endure both pain, limitation, possible negative effects on quality of life and the ethical dilemma caused by these factors, the authors of this study underlines the need for further studies and research on the area of osteoarthritis and conservative treatment methods for the condition.

Conclusion

Individuals diagnosed with medial osteoarthritis experience limitations in activity mostly caused by pain, but decreased function of the knee joint seems to be a contributing factor to limitation in activity as well. Brace usage is to some degree a device easing pain in some activities and therefore enables individuals to take longer walks or participate in activities in everyday life by providing stability to the affected knee. Consider this conclusion with the observation of the few individuals interviewed, which may not generate the same results as of the whole population of individuals diagnosed with medial osteoarthritis.

References

- Anthony, E. T. K., & Wetherbee, E. (2013). Orthoses for Knee Dysfunction. In M. M. Lusardi, M. Jorge, & C. C. Nielsen (Eds.), *Orthotics & Prosthetics in Rehabilitation* (3rd ed., pp. 308-334). St. Louis: Missouri: Elsevier Saunders.
- Axelsson, L. B. (2010). At begrænse smerten ved egen kraft. In M. Schilling (Ed.), *Tab* (1 ed., pp. 147-170). København: Hans Reitzels Forlag.
- Bojsen-Møller, F., Trandum-Jensen, J., & Simonsen, E. B. (2014). *Bevægeapparatets Anatomi* (L. Skogemann Ed.). Slovenia: Munksgaard.
- Dennis, D. A., Komistek, R. D., Nadaud, M. C., & Mahfouz, M. (2006). Evaluation of off-loading braces for treatment of unicompartmental knee arthrosis. *The Journal Of Arthroplasty*, 21(4 Suppl 1), 2-8.
- Gery W., R. (2001). Techniques to Identify Themes in Qualitative Data. In B. H. Russell (Ed.), (1 Edition ed., pp. 12). Department of Anthropology 1350 Turlington Hall: H. Russell, Bernard.
- Granskär, M., & Höglund-Nielsen, B. (2008). *Tillämpad kvalitativ forskning inom hälso- och sjukvård* (F. o. Studentlitteratur Ed. 1:5 ed. Vol. 1:5). Studentlitteratur AB, Lund: Författarna och Studentlitteratur.
- Guiliana, V. J., & Baum, N. (2011). Five rules for connecting with patients to enhance compliance: Building a bridge of credibility and trust. *The Journal of Medical Practise Management: MPM*, 26(6), 363-366.
- Hafner, B. (2008). State-of-the-Science Evidence Report Guidelines. In (pp. 23). 1331H Street, NW, Suite 501 Washington, DC 20005: American Academy of Orthotists and Prosthetists.
- Jarl, G., & Ramstrand, N. (2017). A model to facilitate implementation of the International Classification of Functioning, Disability and Health into prosthetics and orthotics. *Prosthetics and Orthotics International*, 0309364617729925. doi:10.1177/0309364617729925
- Jones, B. Q., Covey, C. J., & Sineath, M. H., Jr. (2015). Nonsurgical Management of Knee Pain in Adults. *American Family Physician*, 92(10), 875-883.
- Lindgren, U., & Svensson, O. (2014). *Ortopedi* (4th ed.). Stockholm: Liber AB.

- Lusardi, M. M. (2013). Principals of Lower Extremities orthoses. In M. M. Lusardi, M. Jorge, & C. C. Nielsen (Eds.), *Orthotics and Prosthetics in Rehabilitation* (3rd ed., pp. 221 - 265). St. Louis: Missouri: Elsevier Saunders.
- Pagani, C. H. F., Böhle, C., Potthast, W., & Brüggemann, G.-P. (2010). Short-term effects of a dedicated knee orthosis on knee adduction moment, pain, and function in patients with osteoarthritis. *Archives Of Physical Medicine And Rehabilitation*, 91(12), 1936-1941. doi:10.1016/j.apmr.2010.09.003
- Parween, R., Shriram, D., Mohan, R. E., Dave, L., & Subburaj, K. (2019). *Methods for evaluating effects of unloader knee braces on joint health: a review*.
- Pathak, V., Jena, B., & Kalra, S. (2013). Qualitative research. *Perspectives in clinical research*, 4(3), 192-192. doi:10.4103/2229-3485.115389
- Ramsey, D. K., & Russell, M. E. (2009). Unloader braces for medial compartment knee osteoarthritis: implications on mediating progression. *Sports Health*, 1(5), 416-426.
- Schmalz, T., Knopf, E., Drewitz, H., & Blumentritt, S. (2010). Analysis of biomechanical effectiveness of valgus-inducing knee brace for osteoarthritis of knee. *Journal Of Rehabilitation Research And Development*, 47(5), 419-429.
- Socialstyrelsen. (2020). Nationella riktlinjer för rörelseorganens sjukdomar: Rematoid artrit, axial spondylartrit, psoriasisartrit, artros och osteoporos. Stöd för styrning och ledning, Remissversion. Retrieved from <https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/nationella-riktlinjer/2020-4-6743.pdf>
- Thoumie, P., Marty, M., Avouac, B., Pallez, A., Vaumousse, A., Pipet, L. P. T., . . . Coudeyre, E. (2018). Effect of unloading brace treatment on pain and function in patients with symptomatic knee osteoarthritis: the ROTOR randomized clinical trial. *Scientific Reports*, 8(1), 10519-10519. doi:10.1038/s41598-018-28782-3
- Trost, J. (2010). *Kvalitativa intervjuer* (4 ed.). Lund: Studentlitteratur AB.
- Turkiewicz, A. (2016). *Epidemiology of osteoarthritis in Sweden. Register and cohort studies on prevalence and mortality*. (PHD Doctoral Dissertation). Lund University, Lund. (1652-8220)
- Vetenskapsrådet, S. (2002). *Forskningsetiska principer inom humanistisk-samhällsvetenskaplig forskning* (Vetenskapsrådet Ed. 1 ed.). Stockholm: Elanders Gotab.
- WHO, W. H. O. (2019a). Assistive devices and technologies. *Assistive devices and technologies*. Retrieved from <https://www.who.int/disabilities/technology/en/>

- WHO, W. H. O. (2019b). Chronic rheumatic conditions. *Chronic rheumatic conditions*. Retrieved from <https://www.who.int/chp/topics/rheumatic/en/>
- Wilson, B., Rankin, H., & Barnes, C. L. (2011). Long-term results of an unloader brace in patients with unicompartmental knee osteoarthritis. *Orthopedics*, 34(8), e334-e337. doi:10.3928/01477447-20110627-07

Appendices

Appendix 1

Question form used in interviews

Questions in Swedish used in the interview

Question a. is intended to be introductory in nature with a narrative focus.

a. Kan du berätta lite om dig själv och din situation?

Question b. is a structural and narrative question, intended to get a sense of the individuals background story.

b. När började du uppleva förändringar i ditt knä?

Question c. is a probing question, meaning we want to know about the patients experience of pain.

c. Hade du knäsmärtor innan du sökte hjälp?

If yes: **Kan du beskriva smärtan?**

If no: **När började du uppleva smärta? Kan du beskriva smärtan?**

Question d. and e. is an evaluative question to get further information about the individuals experience.

d. På vilket sätt påverkas du av smärtan?

e. Påverkas du i din vardag och dina vardagliga sysslor av artrosen?

Question f. is a question of comparative nature to collect information about differences in the individual's experiences and how much the brace is needed.

f. Upplever du att du är beroende av din ortos för deltagande i aktiviteter och motion på grund av artrosen?

Question g. is a prompts/stimuli. The question is meant to get an explanation about the individual's behavior in relation to pain.

g. Hur hanterar du smärtan?

Question h. is a structural and descriptive question meant to get more information about how long the individual have suffered from pain before the intervention of brace.

h. När fick du din knäortos och varifrån fick du den?

Question i. is an evaluative and descriptive question meant to get information about the individual's expectation on the brace and such.

i. Hur kändes det första gången du provade att använda ortos?

Question **j.** is another evaluative and narrative question meant to get further information about the individual's usage of the brace.

j. Hur har du acklimatiserat dig till användning av ortos?

Question **k.** is a descriptive question, asked to get more information about the patients understanding of how to use of the brace.

k. Känner du att du förstår på vilket sätt ortosen är menad att fungera?

Question **l.** is an evaluative question to get information about how the brace helps the individual in terms of pain and function.

l. På vilka sätt tycker du att din ortos hjälper dig?

Question **m.** is both a narrative, descriptive, evaluative and probing question to get understanding of the individuals experience of pain and treatmentprocess.

m. Hur upplever du processen från att ha fått artros till att börja använda ortos?