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## Large variation in use of Patient-reported Outcome Measures; a survey of 188 foot and ankle surgeons

**Level of Evidence:** IV

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### Highlights

- The majority of foot and ankle surgeons uses Patient-Reported Outcome Measures
- A wide variety of outcome measures is used, there is no consensus amongst foot and ankle surgeons
- The AOFAS Hindfoot scale is still most popular outcome measure in foot and ankle disorders
- Most popular PROMs are the MOXFQ and FAOS

## **Abstract**

### **Background**

There is an increasing interest in the use of Patient Reported Outcome Measures (PROMs). However, there is a large variety of PROMs and a lack of consensus regarding preference for their use. Aim of this study is to determine how often PROMS are used for foot and ankle disorders, for what purpose PROMs are used, and what the preferences of the foot and ankle surgeons are, when choosing a PROM to use.

### **Methods**

Members of the Ankleplatform Study Group –Science of Variation Collaborative were invited to participate in this survey by email. The online survey consisted of six questions on the use and preferences regarding foot and ankle PROMs.

### **Results**

188 participants completed the questionnaire. Of the respondents 17% reported not to use PROMs, 72 % stated to use PROMS for research, 39% routinely for patient care and 34% for registration or quality assessment. The respondents were familiar with 30 different outcome measures, of which 20 were PROMs. One of the excluded outcome measures, the AOFAS Hindfoot scale was most commonly reported as preferred outcome measure. FAOS and MOXFQ were the preferred PROMs, reported by 9.7% of the surgeons. Subsequently followed by the FFI (4.3%), the FAAM (3.7%) and the VAS-FA (3.7%).

### **Conclusion**

A large majority of the foot and ankle surgeons uses PROMs. The AOFAS hindfoot scale is mentioned as the most preferred outcome measure, while in fact this is not a PROM. Of the twenty different PROMs mentioned in this study, most reported were the FAOS and MOXFQ both supported by only 9.7% of the surgeons. For proper comparison between patients in clinical practice and research, consensus is needed on which easy-to-use PROM with adequate clinimetric properties should be used. Therefore more evidence in the field of clinimetrics of foot and ankle outcome measures is needed.

**Keywords:** Patient-reported outcome measures, Foot and Ankle Surgery, Ankle injury

## Introduction

Patient reported outcome measures (PROMs) are standardized, validated questionnaires completed by patients to measure their perceptions of their own functional status and well-being.(1) Many measures were originally designed for assessing effectiveness of treatment in the context of clinical trials, but are now also widely used to assess patient perspectives of care outcomes. (2)

Individual physicians and hospitals are increasingly using PROMs, however widespread use by health systems is still uncommon and largely restricted to England, Sweden, and parts of the United States.(3) The integration of PROM data collection into routine clinical practices has been recognized as essential within the movement towards patient-centered approaches to medical care. (4)

Also in orthopedics there is an increasing interest in the use of PROM's. However, there is a large variety of PROMs and a lack of consensus regarding preference for PROMs. A recent study showed that for foot and ankle disorders, 139 scores were described in the literature, of which a large part, up to 25%, were reported in more than five different papers.(5) It has been reported that commonly used foot and ankle PROMs were highly correlated to each other, and therefore the use of a single PROM is sufficient.(6) There is need for a consensus regarding the use of which PROM in foot and ankle disorders.

To achieve consensus, more evidence is needed. A review of validation studies showed that only five PROMS satisfied the four clinimetric categories of evidence: content validity, construct validity, reliability, and responsiveness.(7) In addition, it is important to know what the preferences of the orthopedic surgeon are. The only survey on PROM usage in foot and ankle disorders is performed a decade ago. (8) That study reported 87% of the orthopedic surgeons not to use a validated PROM on a routinely base. Since then, there have been several developments in the use of PROM's. National organizations have started to introduce PROMS in their guidelines.(9) An increasing amount of foot and ankle specific PROMs has been developed and validated. In our opinion there is an increased recognition amongst orthopedic professionals, of the important role PROMs can play in the improvement of patient care, research and quality of health care. It is, however, unknown to

which extent PROMS are currently used by foot and ankle surgeons, and what in their opinion are important properties a PROM should have.

Aim of this study is to determine how often PROMS are used for foot and ankle disorders in the daily orthopedic or trauma surgery practice. In addition we will determine for what purpose PROMs are used and what the preferences of the foot and ankle surgeons are, regarding PROMs.

## **Methods**

### *Population*

All members of the Ankleplatform Study Group –Science of Variation Collaborative, except residents and physiotherapists, were invited to participate in this survey. The Ankleplatform Study Group is part of the Amsterdam Foot and Ankle Platform ([www.ankleplatform.com](http://www.ankleplatform.com)), a worldwide collaboration of experts in the field of foot and ankle surgery, consisting of orthopedic, trauma and podiatric surgeons..

### *Design*

A survey was developed and tested on three orthopedic surgeons of our own institute. Based on the feedback of this pilot, the questionnaire was adapted. The definitive version of the survey consisted of the following six questions:

1. Which Foot and Ankle PROMs are you familiar with?
2. For what purpose do you use Foot and Ankle specific PROMs?
3. Which PROM(s) do you prefer to use?
4. What makes you choose a specific PROM?
5. Which properties (*according to the COSMIN checklist(10)*) are most important when deciding to use a specific PROM in individual patient care?
6. Which properties (*according to the COSMIN checklist(10)*) are most important when deciding to use a specific PROM in research?

Members were invited by email. To participate in this study, participants were asked to log on to the study page on [research.ankleplatform.com](http://research.ankleplatform.com). Participants had two weeks to fill out the questionnaire. A reminder was send after one week.

Demographic characteristics were collected from the Amsterdam Foot and Ankle Platform –

member database.

Only real patient-reported outcome measures were included in the analysis. Physician-based or mixed outcome measures were excluded.

### *Statistical analyses*

Categorical data were presented as frequencies and percentages or as mean and standard deviation in case of continuous data. Categorical outcomes were compared using Chi-square test. P values < 0,05 were considered statistically significant. Statistical analyses were performed using Rstudio version 0.98.1103 (RStudio, Boston, MA, USA), R version 3.1.3 (The R Foundation, Vienna, Austria).

### **Results**

A total of 377 members were invited. One hundred eighty-eight completed the online questionnaire within two weeks, resulting in a response rate of 50%. Of the responding members, the mean age was 37.8 (SD 7.1). A large majority was male (94%), 22.3% were employed in an academical centre. The members originated from 53 different nations, representing all six continents. Most common country of origin was United Kingdom (12%), followed by the Netherlands (9%), Italy (8%), Brazil (6%) and Spain (6%).

Of the respondents 17% reported not to use PROMs, 72 % stated to use PROMs for research, 39% routinely for patient care and 34% for registration or quality assessment.

Thirty different outcome measures were mentioned, of which ten non-PROMs were excluded. (Table 1) One of the excluded outcome measures was the AOFAS Hindfoot scale, that was a mentioned as preferred PROM by 78 surgeons (41.4%).

Of the twenty included PROMs, the VAS-FA (50.0%) was the most frequently mentioned followed by the FAOS (28.2%), AAOS-FAM (23.4%), FFI (22.3%) and FADI (15.4%). (Figure 1) The FAOS and MOXFQ were the most preferred PROMs, both reported by 9.6% of the surgeons. Subsequently followed by the FFI (4.3%), the FAAM (3.7%) and the VAS-FA (3.7%). (Figure 2)

To the question what the most important reason is to use a specific PROM, 71% answered 'Quick and easy to use', followed by 'Commonly used in literature' (68%) and 'Validated and

proven reliable' (60%). Used by colleagues (31%) and prescribed by hospital or institute (3%) were less reported as reason for usage. Most important characteristics of PROMs were similar for both research and patient care. (Figure 3)

Surgeons younger than 40 years were more likely to use PROMs compared with older colleagues (90% vs 77%,  $X^2=4.44$   $p = 0.035$ ).

## Discussion

The most important finding of this study is that a large majority of the respondents use PROMs, however, a large variety in both the use of PROMs and preferences amongst foot and ankle surgeons exists. 39% uses PROMs routinely in patient care and only 34% uses PROMs for quality assessment. Among physicians that do use PROMs, there is a large variation in which PROM is preferred. The FAOS and MOXFQ are currently the most commonly preferred PROM. Younger surgeons are more likely to use PROMs.

With twenty different PROMs mentioned by the participants, this study shows the large variety of available outcome measures in foot and ankle patients. Nineteen were also reported as most preferred. Therefore this study underlines the disunity amongst surgeons regarding PROMs. This is also supported by the fact that the most popular PROMs were only mentioned by 9.7% of the participants. Quick and easy to use, commonly used in the literature, being validated and proven reliable are the most commonly reported arguments for the use of a specific PROM. This corresponds to the most popular PROMs, FAOS and MOXFQ, both easy to use and well validated in different languages. (11-13)

In the survey performed by Lau et al. on ankle outcome measurements, the AOFAS Hindfoot scale was preferred by the majority respondents (64%). (8) It has to be noted that this was a survey among AOFAS members. We conclude that a decade later, the AOFAS Hindfoot scale is still a popular ankle outcome measure. The same study showed that 45% did not use a questionnaire.(8) When compared to our results, it seems that in the past decade the use of PROMs has increased, since only 17% of respondents did not use PROMs. Lau et al. also found that a large proportion of the respondents (41%) did not know which questionnaire was validated. Of the respondents in this study 60% stated that they choose a PROM when it

is validated and proven reliable. This shows there is room for more awareness on the importance of the use of validated outcome measures.

We excluded the AOFAS score out of our analysis, because it is not (only) a PROM. However, it was mentioned by a large group of the participants in this study as the their preferred 'PROM'. Although the AOFAS Hindfoot score is quick and easy to use, the score has some disadvantages. Though literature suggest differently, the AOFAS Hindfoot scale is not a PROM. It contains subjective questions relating to pain and function and objective questions regarding motion and stability, both filled out by the physician. This makes the AOFAS Hindfoot scale not suitable for direct comparison with results from pure patient reported outcome measurements, since the AOFAS score is not filled out by the patient alone. A recent study that investigated which outcomes are most important for patients, it was found that up to half of the elements of the AOFAS scores are not of primary importance to the patient. (14)

In a systematic review, Hunt and Hurwit identified 139 different patient-reported foot and ankle specific outcome measures. The AOFAS Hindfoot scale was the most popular outcome measure, followed by VAS and SF36, both PROMs that are not site-specific. Their reported most popular foot and ankle PROM was the FFI, used in only 6% of the studies. (5) Martin and Irrgang reported only five patient-reported outcome measures (SARS QOL, FFI, FHSQ, LEFS, FAAM) to have supporting evidence in terms of content validity, construct validity, reliability and responsiveness.(7) It was reported that there was discrepancy in terminology with respect to validity, reliability and responsiveness. Hence, PROMs should be chosen on base of commonly accepted and used definitions of these values. Therefore, it should be considered to use a consensus in these criteria. For example the criteria developed by the COSMIN group(15) could be used in further research on clinimetric properties of patient reported outcome measures. As stated by the COSMIN group, a PROM needs translation and validation in the countries native language. The lack of different language versions might restricts the use of PROMs in non-native English populations. This possibly also explains the low rate of use of the most popular PROMs in this survey.



Strength of this survey is the generalizability; respondents represent 53 different countries. The response rate of 50% is good, especially in comparison with other surveys.<sup>(8)</sup> It provides a reliable sample of the members of the Ankleplatform, an educational platform for orthopedic and trauma surgery with interest in foot and ankle surgery. Prior to participate in the survey, the members of Ankleplatform were not informed on the use of PROMS, therefore the chance of recall bias is small.

The advantage of using PROMs in healthcare is the ability to detect results of treatments and improvement in individual patients. Furthermore, with PROMs, outcomes of specific disorders can be compared between patients, hospitals and even between countries. Hence, they can be used to compare and improve quality of healthcare. This study emphasizes the need for consensus and consistency in their use. Foot and ankle surgeons prefer easy to use and validated outcome measures. Therefore more evidence is needed on the clinimetric properties of the available patient-reported outcome measures. Future studies should focus on the comparison of clinimetric properties of PROMs in foot and ankle disorders.

### **Conclusion**

The large majority of the foot and ankle surgeons in this survey uses PROMs. The AOFAS hindfoot scale is mentioned as the most preferred outcome measure, while in fact this is not a PROM. Of the twenty different PROMs mentioned in this study, most reported were the FAOS and MOXFQ both supported by only 9.7% of the surgeons. For proper comparison between patients in clinical practice and research, consensus is needed on which easy-to-use PROM with adequate clinimetric properties should be used. Therefore more evidence in the field of clinimetrics of foot and ankle outcome measures is needed.

### **Contribution of authors:**

RZ, HW and WM were involved in conceptualization and design of the study. RZ and HW performed data collection and conducted statistical analysis. RZ, HW, WM, CD and GK revised the manuscript and approved the final version. ASC completed the questionnaire as experts in the field of foot and ankle surgery.

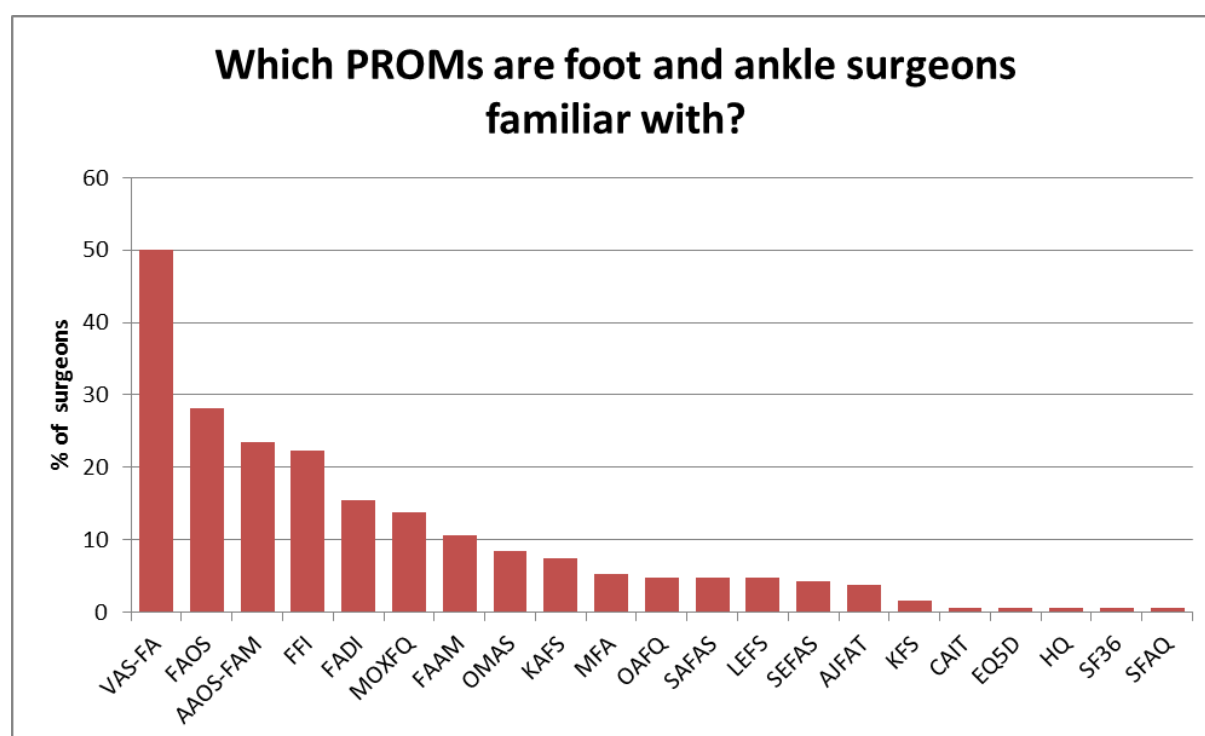
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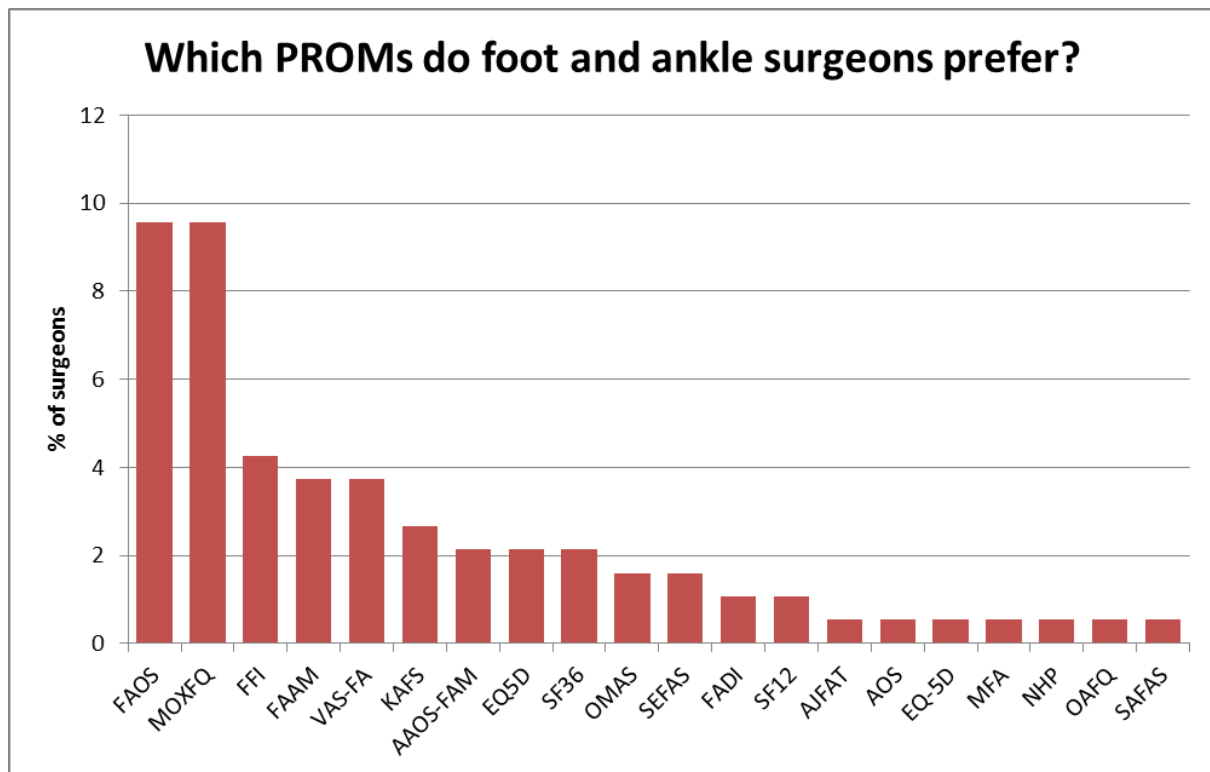
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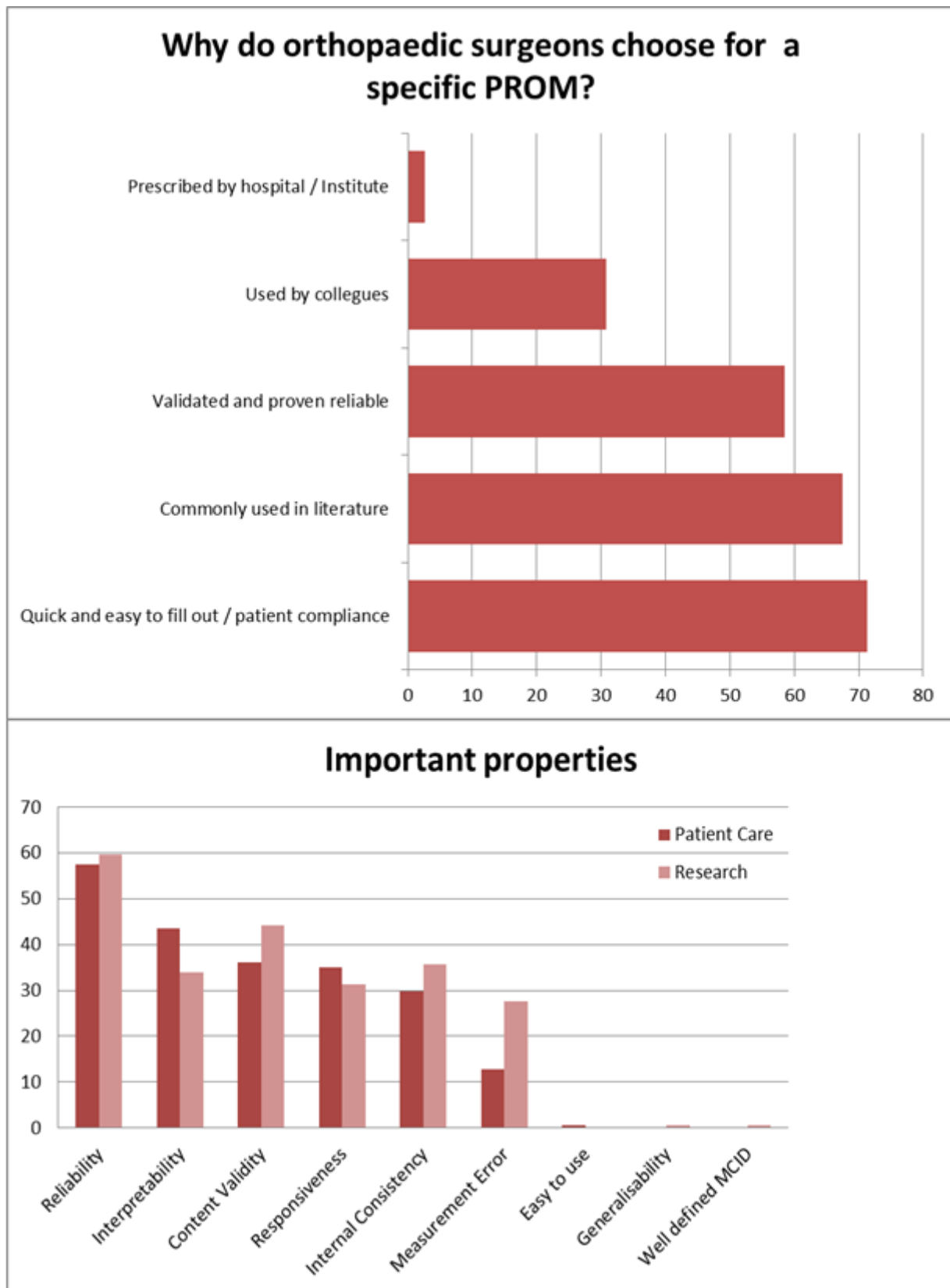
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**Figure 1.** PROMs surgeons are familiar with.

**Figure 2.** Most commonly preferred PROMs.

**Figure 3.** A. Arguments to choose for a specific PROM. B. Important clinimetric properties.





**Table 1.** Overview of all outcome measures mentioned by study participants and their abbreviations

Abbreviation	Name	First publication
<b>PROMs</b>		
AAOS-FAM	American Academy of Orthopaedic Surgeons Lower Limb Outcomes Assessment Instruments- Foot and Ankle Module	Johanson et al. (16)
AJFAT	Ankle Joint Functional Assessment Tool Questionnaire	Rozzi et al. (17)
CAIT	Cumberland ankle instability tool	Hiller et al. (18)
EQ5D	EuroQoL five dimensions questionnaire	EuroqolGroup (19)
FAAM	Foot and Ankle Ability Measure	Martin et al (20)
FADI	Foot Ankle Disability Index	Martin et al (21)
FAOS	Foot and Ankle Outcome Score	Roos et al. (22)
FFI	Foot Function Index	Budiman-Mak et al(23)
HQ	Hannover Questionnaire	Thermann et al. (24)
KAFS	Karlsson Ankle Function Scale	Karlsson and Peterson (25)
LEFS	Lower Extremity Function Score	Binkley et al. (26)
MFA	Musculoskeletal Function Assessment	Martin et al. (27)
MOXFQ	Manchester-Oxford Foot Questionnaire	Dawson et al. (13)
OAFQ	Oxford ankle foot questionnaire for children	Morris et al (28)
OMAS	Olerud-Molander Ankle Score	Olerud and Molander(29)
SAFAS	Sports Athlete Foot and Ankle Score	Morssinkhof et al. (30)
SEFAS	Self-reported Foot and Ankle Score	Cöster et al. (31)
SF36	Short-Form 36	Ware and Sherbourne (32)
SFAQ	Swindon Foot and Ankle Questionnaire	Waller et al. (33)
VAS-FA	Visual Analogue Scale Foot and Ankle	Richter et al. (34)
<b>Excluded</b>		
AAS	Ankle Activity Score	Halasi et al (35)
AFS	Ankle Function Score	De Bie et al. (36)
ACFAS	American College of Foot and Ankle Surgeons Scoring Scales	Cook et al. (37)
AOFAS	American Orthopaedics Foot and Ankle Society – Ankle Hindfoot Scale	Kitaoka et al (38)
BHO	Berndt and Harty outcome question	Berndt and Harty(39)
JSSF	Japanese Society for Surgery of the Foot standard rating system	Niki et al. (40)
KFS	Kaikkonen Function score	Kaikkonen et al. (41)
LS	Leppilahti score	Leppilahti et al (42)
OH	Ogilvie-Harris scoring system	Ogilvie-Harris et al. (43)
Tegner	Tegner Activity Scale	Tegner and Lysholm (44)