Chapter 9

General discussion
The found prevalence of foot pain in the adult general population ranges from 22% to 25%(20)(15). Foot pain may impair mobility and decrease the sense of well-being (22). A variety of different disorders may result in foot pain. Early treatment helps maintain the patient's ambulatory status and prevents irreversible pathology (23).

The main goal of this thesis was to evaluate the standard of present nomenclature (definition) of specific forefoot disorders and the treatment of these disorders. The studies were specifically focussed on lesser toe deformities and rheumatoid forefoot deformity. This thesis includes two clinical studies, one concerning the operative treatment of claw toe deformity and a study concerning the operative treatment of rheumatoid forefoot deformity.

General appraisal of existent scientific data on forefoot problems demonstrate limited higher quality studies, with a lack of uniformity. It is of great importance that general knowledge concerning the treatment of forefoot problems expands, resulting in the improvement of care.

CHAPTER 2

A wide range of definitions of lesser toe deformities is reported in the literature (9)(1) (17,19)(18). The same lack of uniformity also accounts for the treatment modalities of lesser toe deformities (9). We evaluated the standards in Dutch orthopaedic practice on this topic, by sending a questionnaire to all departments. The results were compared to the standards (algorithms) by RA Mann and MJ Coughlin (2,3).

Our data can be considered as a representative sample of Dutch orthopaedic surgeons (75% response rate). The found definition of hammer and claw toe only conformed in 24% and 9% of the cases, respectively, with the definitions as adopted by Coughlin and Mann. A deformity described as a hammer toe by one department, would be described as a hammer toe by another. Particularly, the inclusion of the position of the metatarsophalangeal (MTP) joint as criterion for hammer or claw toe varied enormously. Twenty percent of respondents stated that they do not differentiate between a hammer and claw toe.

Our study also reported on the operative strategies which are applied in the Dutch practice. Most respondents considered proximal interphalangeal (PIP) joint resection as the gold standard for the treatment of a rigid hammer toe deformity, as in accordance with Coughlin and Mann. However, also PIP joint fusion was a frequently applied surgical method. The confusion in definitions might explain that in some institutions the treatment of a hammer toe is the same as the treatment of a claw toe deformity in another institution. We concluded that limited consensus on definitions and treatment of lesser toe deformities exists in Dutch orthopedic practice. Only if a consensus on definitions of the different lesser toe deformities is reached and applied, can treatment results be correctly interpreted and improved.
CHAPTER 3

We performed a study in which we evaluated applied definitions of lesser toe deformities in scientific literature. Despite the fact these are common deformities in general orthopedic practice little consensus on definitions was found. This lack of uniformity might be explained by diversity of opinions regarding the pathophysiological process underlying the deformities (13)(17). Additionally, the deformity may be described solely on the basis of the position of certain joints without taking into account the flexibility of these joints. Opinions are experienced based and the quality of evidence is low.

In order to provide clarity and the basis for further research, we proposed a definition of hammer toe and claw toe deformity in the discussion in this literature study. Again, such a proposal is experience based. It is suggested that in the case of hammertoe deformity the MTP joint is positioned in dorsiflexion, but the joint is still flexible allowing plantarflexion. In case of a clawed toe the MTP joint has become stiffened in an extended position. This distinction is found important because the fixed extended position of the MTP joint might give rise to pain in the plantar aspect of the MT head (MTH) due to biomechanical overload, whilst this is not the case in the case of a flexible MTP joint. In both conditions the PIP joint exhibits a flexed position. It is assumed that the hammer toe and the claw toe can be different stages in the same pathophysiologic process; thereby the hammer toe precedes the development of a claw toe deformity. This proposal of the definitions of hammer and claw toe might lead to promotion of uniformity and thus a better set-up of future clinical trials/studies.

CHAPTER 4

The conclusions of the previous study triggered us on performing a randomized clinical trial, in which a PIP joint resection was compared with a PIP joint fusion. All patients included in this multi-centric study suffered from one or more rigid PIP joint flexion deformities. In addition to the PIP joint procedure a MTP joint release was performed if deemed necessary. To our knowledge, this is the first randomized trial on this subject. Twenty-six patients (39 toes) were included in the PIP joint resection group and 29 (50 toes) in the PIP joint fusion group. No significant differences in AOFAS scale, the FFI and VAS could be detected, after one year of follow-up. Thus, the clinical outcome of both procedures was found to be similar. Both procedures resulted in a good to excellent outcome in pain and activity scores. The only statistically significant difference was found regarding the toe alignment in the sagittal plane, in favor of PIP joint fusion. The clinical implications of this finding remains unclear.
CHAPTER 5

Rheumatoid arthritis is recognized as an important cause of forefoot problems, despite significant improvement of pharmacological treatment that has been achieved over the last decade (5,11,12,14,16). Our literature study provided an overview of the pathophysiology and operative treatment options of rheumatoid forefoot problems. The gold standard in the treatment of severe deformity of the lesser MTP joints remains to be a surgical procedure in which all the metatarsal heads are resected (4). From a biomechanical point of view and considering the fact that not all lesser MTP joints are as severely diseased, it might be more advantageous to perform an operation preserving the MTP joints. From this review we learned that no comparative prospective outcome studies had been performed on evaluation of these two different surgical methods.

CHAPTER 6

The conclusions of the previous study triggered us on performing a randomized clinical trial, in which a MTH resecting procedure was compared with a MTH preserving procedure (as described by Louwerens et al.) (21). All patients included in this multi-centric study suffered from an established erosive rheumatoid arthritic forefoot deformity, resulting in metatarsalgia. All participating surgeons applied the same operative procedures, after practicing at a cadaveric session. All patients underwent fusion of the first MTP joint. Fifteen patients were treated according to the method of MTH resection and 14 underwent MTH preservation. Three patients were excluded and three patients withdrew from the study. Eventually 23 patients (10 in the MTH preservation group) were analysed.

After one year of follow-up no statistically significant differences in AOFAS score and additional outcome factors were found. Analysis of the difference in functional limitations and MTP joint function (item number 2 and 4 of the AOFAS score) did not show a statistical significant difference between the two groups. The feet in both groups showed adequately aligned lesser MTP joints on standard radiographs, with exception of one patient after MTH preservation. Both procedures resulted in considerable improvement of pain and activity scores. From a scientific point of view it must be concluded that one operative method cannot be recommended as better than the other. From an experience based point of view the authors did learn from this study. With the MTH preserving method the biomechanical function of the foot is maintained. The participating surgeons became convinced to advising a more tailored approach on a patient with rheumatoid forefoot deformity. The less extensive the deformity, with less destruction of the MTH, the more the tendency exists to advise a MTP joint preserving procedure, respecting and reconstructing the normal functional anatomy.
Chapter 9

The more severe the contracture of the soft tissues, with important damage of the lesser MTP joints, the more it is felt that resection-arthroplasty of the lesser MTP joints is required.

CHAPTER 7

After performing several studies we recognized no specific forefoot outcome scores existed, despite a current trend towards increasing the application of validated and standardized Patient Reported Outcome Measures (PROMs)(10). This encouraged us to perform a literature study on PROMs directed at patients with hallux valgus, as these outcome tools might be applied for general forefoot deformities. In our study twenty-eight eligible studies were included and evaluated. The psychometric properties of these instruments describe the relevance, quality and measurement properties. The Manchester-Oxford foot questionnaire (MOXFQ) showed the best psychometric properties and was specifically designed as an outcome measure for hallux valgus corrective surgery (7)(6,8). The self-reported foot and ankle score (SEFAS) may be an good alternative, however it contains less items which are regarded as important by patients with foot/ankle complaints. A relative drawback of the MOXFQ is the copyright license.

CHAPTER 8

The PROM data capture method may be an important factor contributing to the response rate, and various distinct methods for contacting patients are in use. A suboptimal participation rate gives rise to a possible selection bias and decreases the validity and interpretability of PROMs considerably. We evaluated which PROM data capture method resulted in the highest response rate, by randomization in three different methods, amongst a patient population after hallux valgus surgery (10).

Of the 73 included and randomized patients, 25 were approached by mail, 24 by email and 24 patients by telephone. The response rate from the traditional mail was highest, with 88%. Response rate from the telephone was 79%, while response from the email was lowest, with 33%. Age and gender did not influence the response rate in this study.

Though electronic data collection has enormous potential, this study showed that email yields an unacceptable low response rates on PROMs. Limited anonymity by using email might be a factor which explains this low response rate. It is too early to replace traditional pen-and-paper PROMs by electronic questionnaires. Better ways of data collection are essential for improving the quality of care. Probable accessibility of a computer in the clinic setting might further enhance the response rate.
FUTURE PERSPECTIVES

It is the author’s opinion that in general orthopaedic practice forefoot problems are occasionally underestimated and misinterpreted, leading to inadequate treatment. There may be a discrepancy between the significance of foot and ankle problems on one hand and the expertise and attention on the other. This could have various reasons.

More research should be performed directed at forefoot problems. As a result of aging, wrong foot wear and sports activities the prevalence of forefoot problems will rise. This asks for a better support for the applied definitions, treatment strategies and outcome. A validated outcome tool, with adequate psychometric properties, specifically designed for forefoot problems, should be developed and adopted. During orthopaedic training programmes more emphasis should be put on foot and ankle problems and treatment.
REFERENCES


