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The clinical and patient centered outcomes following surgical correction of tailor's bunion in an acute hospital based podiatric surgery service

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This paper presents the results of the clinical and patient reported outcomes of patients following fifth metatarsal scarf osteotomy performed for correction of tailor's bunion deformities utilizing the Manchester Oxford Foot Questionnaire (MOXFQ), Patient Satisfaction Questionnaire-10 (PSQ-10) and radiographic analysis. The electronic records of 24 patients (25 feet) were reviewed retrospectively after they had undergone the procedure between 2014 and 2018. Student paired t-test was used to compare pre- and postoperative outcomes from the MOXFQ and fourth-fifth intermetatarsal angle (4-5 IMA) and fifth metatarsophalangeal joint angle (5-MTPA). Differences were considered statistically significant if the probability of the null hypothesis was less than 0.05. A 95% confidence interval was observed for MOXFQ and radiographic measurements. For PSQ-10, a thematic analysis was undertaken to identify patterns of important themes in question 1 responses data and a quantitative descriptive design was applied to question 2 to 10 numerical data scores. A significant reduction in all three MOXFQ domains was observed: scores of walking/standing (W/S) 54.7 to 20.2; pain (P) 60.4 to 22.2 and social interaction (SI) 50.4 to 6.7. A 95% confidence interval for the difference was given for MOXFQ scores: 22.786, 46.254 (W/S); 29.507, 46.893 (P) and, 34.534, 52.826 (SI). The mean preoperative 4-5 IMA was 11.6° and 5-MTPA measurement was 19.8°; the mean postoperative 4-5 IMA was 5.7° and 5-MTPA was 8.0°. The p-values for the W/S, P and SI differences and radiographic evaluations were <0.001. PSQ-10 scored 88.0 and 96% recorded 'pain relief' in patient's expectation. There were 6 cases (24%) of surgical sequelae. This service review indicated high levels of patient satisfaction with the procedure and a relatively low number of complications. From a clinical point of view, it allows a greater amount of correction in transverse and sagittal planes variants and is inherently stable amenable to two screws fixation.

Keywords: tailor's bunion, scarf osteotomy, MOXFQ, PASCOM-10, PSQ- 10

Tailor's bunion, also known as bunionette or digitus quintus varus, is a pathological deformity of the fifth metatarsophalangeal joint (MTPJ), characterised by a bony protuberance of the lateral aspect of the fifth metatarsal head [10]. The classification of tailor's bunion by Coughlin in 1991 is based on standard weight-bearing radiographic measurements [8]. Coughlin [14] defined the three types of tailor's bunion as:

- Type 1: A lateral exostosis of the fifth metatarsal head (dumbbell-shaped)
- Type 2: Lateral bowing of the distal aspect of the fifth metatarsal shaft
- Type 3: Increased fourth-fifth intermetatarsal angle (4-5 IMA), of more than 10° for patients with symptomatic tailor's bunion

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- Type 4: Added on by DiDomenico in 2013, describes patients with a combination of deformities; including 2 or more combinations of the above.

The pathophysiology of tailor's bunion is multifactorial attributed to both its anatomical and biomechanical variations and therefore, understanding and characterising each component of the deformity is key to treating it successfully [24]. Although tailor's bunion is not analogous to hallux abducto valgus (HAV) in its etiopathogenesis, both deformities can frequently occur concomitantly; known as splayfoot deformity [17,36]. However, the diagnosis of tailor's bunion is often overlooked when patients present with HAV as their main complaint [13].

First line conservative treatments of the pathology include footwear alteration, use of orthoses, oral/topical analgesics and corticosteroid injection [43]. Surgical intervention may be considered if symptoms remain persistent despite conservative management and/or when the disease progresses to its more severe form. Different procedures have been suggested and reported for the tailor's bunion with varying outcomes. Similar to the surgical management of HAV, osteotomies of the fifth metatarsal can be grouped into proximal, mid shaft or distal, depending on the severity of deformity [3]. Some of these corrective measures range from a simple lateral fifth metatarsal head exostectomy for early stages of the deformity to osteotomies and lastly, in cases of unreconstructable deformities may require a fifth metatarsal head resection [34,40].

As with any surgical procedure, there are advantages and disadvantages. For less severe tailor's bunion deformities, distal osteotomies are beneficial and, owing to the increased blood supply at this location, have lesser risk of delayed and/or non-union [29]. In contrast, proximal osteotomies are effective in correcting deformities with a 4-5 IMA which exceeds 9° and provides greatest satisfaction score but disadvantages would include inherent instability of the location of the osteotomy, disruption of intra- and extraosseous blood supply of the metatarsal, and technical demand [43]. Similar to proximal osteotomies, diaphyseal osteotomies have also been found to achieve a greater 4-5 IMA correction and allows a triplanar correction [5]. Furthermore, diaphyseal osteotomies have more bone to bone surface thereby allowing fixation without compromising the vascular supply [5,25].

Procedure

Within the Sheffield Teaching Hospital National Health Services Foundation Trust (STH NHSFT) Department of Podiatric Surgery, the fifth metatarsal scarf osteotomy is routinely performed for the correction of tailor's bunions of varying intermetatarsal angles. It is a diaphyseal osteotomy originally developed by Weil as the "Reverse scarf" and later popularised by Barouk [2,42]. The procedure in STH NHSFT was performed by three podiatric surgeons; a Consultant and two Registrars. The two Registrars had undertaken their surgical training with the Consultant and it is therefore hoped that this would minimise the commonly occurring variations in surgical approach/technique [32].

The surgical technique performed is similar to that described by Maher and Kilmartin (2010) whereby the osteotomy is fixed with two countersunk 2.0mm cortical screws (Figure 1) [25].

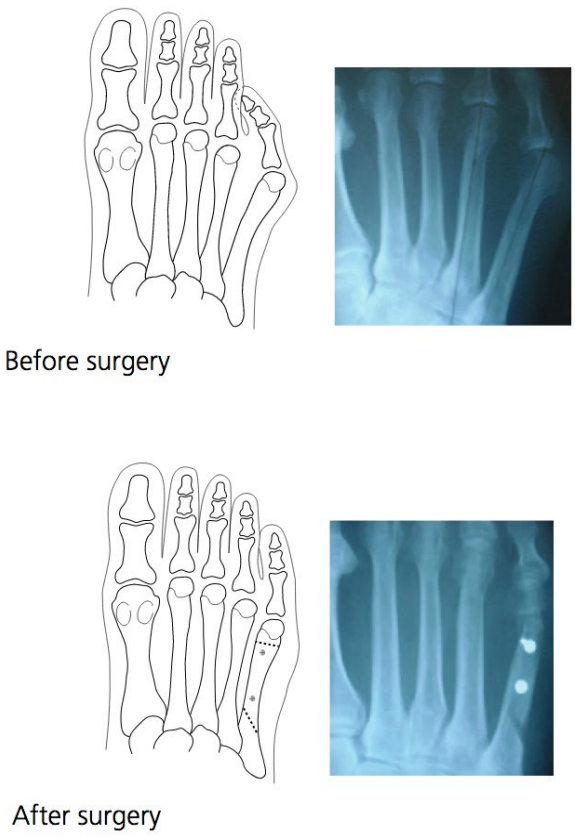

Figure 1 Pre- and postoperative demonstration of surgical technique.

Summary of Surgical Technique

1. The procedure is carried out under regional anesthesia block with the use of an ankle tourniquet.
2. A linear longitudinal skin incision is made down the lateral border of the fifth metatarsal, with a double elliptical incision over the fifth metatarsal head.
3. Sharp and blunt dissection is undertaken maintaining hemostasis.
4. Double elliptical lateral capsular incision is performed.
5. The tissue is reflected from the dorsal and plantar metatarsal and the fifth MTPJ exposed.
6. Lateral eminence is removed with a sagittal saw.
7. A longitudinal cut to the metatarsal shaft is made with a slight dorsal inclination through both the lateral and medial cortices.
8. A perpendicular cut is made transversely across the metatarsal dorsally at the distal end.
9. An oblique cut is made transversely across the metatarsal plantarly at the proximal end.
10. The metatarsal head is internally rotated about a proximal axis whilst preserving its length and temporarily held with a bone clamp.
11. When satisfied with the position, two bicortical holes are drilled, countersunk and measured.
12. Permanent fixation is applied utilizing two DePuy Synthes 2.0mm cortical screws**.**
13. Stability is assessed versus distraction in all planes.
14. Lateral overhang is removed with a sagittal saw.
15. Deep tissue closure is undertaken with 3/0 vicryl and the skin with a 4/0 monocryl.
16. Dressings are applied and postoperative shoe worn. Patients are allowed to partially ambulate on the heel of the operated foot with crutches for 2 weeks.
17. Patients are reviewed at 2 weeks postoperatively for suture removal and transfer into supportive footwear.

Materials and Methods

This was a single-center retrospective service evaluation which reviewed the outcome of 24 patients (25 feet) who underwent a fifth metatarsal scarf metatarsal osteotomy between 2014 and 2018. This paper utilizes existing surgical audit data generated by and extracted from the Podiatric Audit of Surgery and Clinical Outcome Measurement (PASCOM-10). This online database is registered to the STH Podiatric Surgery Unit. Any PASCOM-10 reports with incomplete Manchester Oxford Foot Questionnaire (MOXFQ) and Patient Satisfaction Questionnaire **(**PSQ-10) data have been excluded.

The two functional outcome scoring instruments used within PASCOM-10 for this service evaluation were:

i) the MOXFQ; captured on the day of surgery and, at six months' final check postoperative appointment.

ii) the PSQ-10, taken at the final six months follow up (no pre-treatment component for this domain).

Both MOXFQ and PSQ-10 are two powerful Patient Reported Outcome Measures (PROMs) instruments as they provide an insight into patient experiences of pain and foot function as well as an overall indication of the surgical outcomes [28]. The MOXFQ contains 16 items, each with five response options consisting of three underlying domains: Walking/Standing (W/S) (seven items), Pain (P) (five items), and Social Interaction (SI) (four items). Similar to a Likert scale, each item response is scored from 0 to 4; where the highest value denotes the most severe state and therefore, lower scores in each domain in the postoperative MOXFQ are indicative of positive patient outcomes [11]. The three domains scales have gone through extensive testing and have shown to have excellent psychometric properties in terms of reliability, validity and responsiveness, and is comparable to other known instruments such as American Orthopaedic Foot and Ankle Score (AOFAS) and Short-Form health survey questionnaire-36 [11,12].

In comparison to the MOXFQ, the PSQ-10 has yet to be formally tested for its validity, however, the instrument has been chosen for use in PASCOM-10 due to its reliability and repeatability [27,39]. The PSQ-10 asks patients a series of 10 questions relating to their experience of an episode of care. In question 1, it outlines the reason why the patient had sought treatment from the services. For this section of the questionnaire, there is no scoring attached and therefore, not included in the final scoring of the patient satisfaction. For question 2 to 10, these questions are in a fixed-response format with a maximum score of 100 to indicate satisfaction while scores below 70 are indicative of poor surgical outcomes and patient satisfaction [45].

A quantitative descriptive design was applied to the numerical data scores obtained from MOXFQ and PSQ-10 question 2 to 10 and radiographic

evaluations. This allows for application of student paired t-test utilizing IBM Statistical Package for Social Sciences (SPSS) 24.0 to compare the MOXFQ as well as fifth MTPJ angle (5-MTPA) and 4-5 IMA measurements pre- and 6 months postoperative. The first question of the PSQ-10 is distinguished from the rest of the questionnaire as it incorporates a free text response space for patients to articulate their expectations from the treatment. Therefore, a qualitative approach was required for further analysis of the answers and to identify patterns of important themes in the responses data. Incorporation of this qualitative analysis of such statements contributes to the evaluation of the service [1].

Essential data collection on PASCOM-10 begins when patients are listed for surgical treatment. The start of an episode commences with a referral and finishes with a discharge [6]. Each patient may require multiple episodes recorded and, in the event of a revision surgery, a new treatment episode would be required. Should there be any postoperative events such as sequela i.e., complications, clinicians are required to record these data onto PASCOM-10 as part of their routine practice. The data metrics used for this study have all been obtained from patients exclusive to the STH Podiatric Surgical unit; who have all been informed of, and consented to their data being potentially used for educational or research purposes. Consenting patients would complete their MOXFQ and PSQ-10 forms before the data is transferred onto PASCOM-10. To ensure unsolicited answers are obtained, the questionnaires are generally completed in the outpatient waiting room following the consultation whereby they were listed for surgery.

For the MOXFQ scores, a hypothesis test was set up as the following below;

- H_0 (null): There is no effect of the procedure on MOXFQ W/S,P and SI

- H_1 (alternate): There is an effect of the procedure on MOXFQ W/S, P and SI

The decision to reject the null hypothesis (H_0) or fail to reject was based on the p-value. Differences were considered statistically significant if the probability of the null hypothesis given the data was less than 0.05.

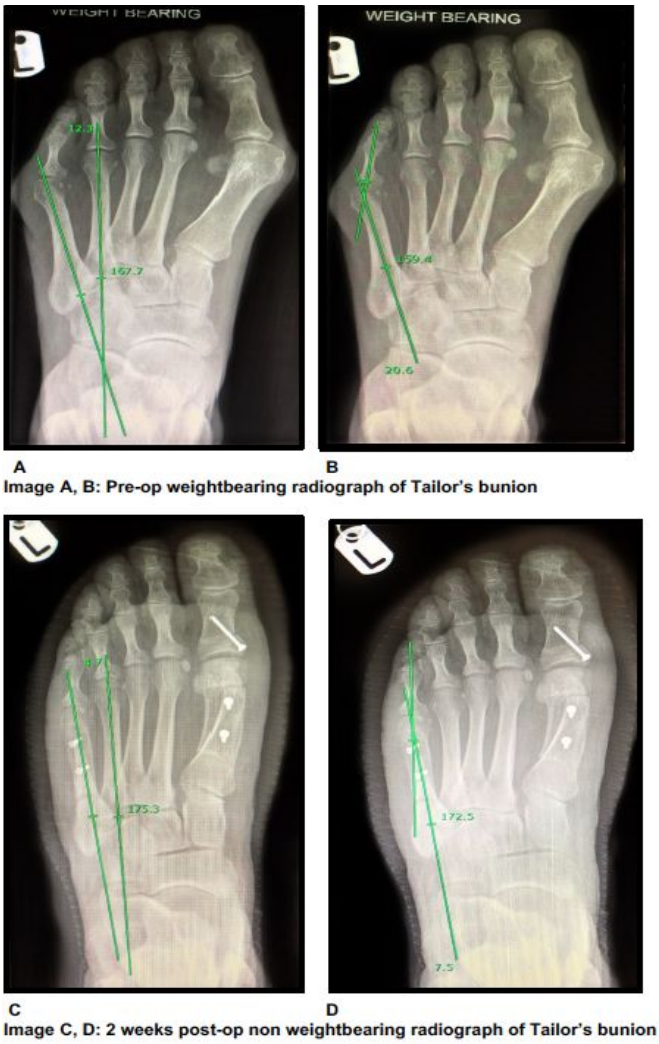

Figure 2 Pre- and postoperative A/P radiograph of fifth metatarsal scarf osteotomy with concurrent procedure scarf and Akin osteotomy.

A 95% confidence interval was observed for MOXFQ as it provides a statement on the level of confidence that the true value for a population lies within a specified range of values [38].

Radiographic Data Collection

Anteroposterior (A/P) weight-bearing radiographic measurements were obtained at pre- and postoperatively at 2 weeks. The radiographic evaluation, reviewed by the first author, compared the pre- and postoperative 5-MTPA and the 4-5 IMA. The 5-MTPA was measured by bisecting the fifth metatarsal shaft and the shaft of the fifth proximal phalanx and the 4-5 IMA was measured utilizing the traditional technique of bisecting the long axes of the fourth and fifth metatarsal shafts. These measurement techniques were preferred as they were found to be both reliable and reproducible in comparison to others such as the modified version by Fallat &

Buckholz [16,37]. The average 4-5 IMA in normal patients has been reported to be 6.4 to 9.1 degrees and 8.7 to 10.8 degrees in symptomatic tailor's bunion [9,30]. The 5-MTPA was determined to be 10.2° varus in normal feet and 16.6° varus in symptomatic tailor's bunions [30].

It is recognised and accepted by the study that the preoperative x-ray films are weightbearing and the postoperative are non-weight bearing. This could lead to an inaccuracy in the angular improvement in the surgery which is one of the shortfall of this aspect of the study.

Results

At the time of surgery, as displayed on Table 1, the mean age was 44; range 19-74 years old (y/o). 21 (84%) patients were female, and 4 (16%) were male. The majority of the sample were females (N=21) with an average age of 43.6 y/o (1.dp) and a standard deviation (SD) of 17.9. There were 4 males who had the procedure with an average age of 44.5 y/o (1.dp) and SD of 24.3. An age range of 25-29 y/o showed to have the highest percentage (20%) of patients with 4 females and 1 male.

Age Range	Male (N)	Male (%)	Female (N)	Female (%)	Total (N)	Total (%)
15-19	0	0%	2	8%	2	8%
20-24	1	4%	1	4%	2	8%
25-29	1	4%	4	16%	5	20%
30-34	0	0%	1	4%	1	4%
35-39	0	0%	0	0%	0	0%
40-44	0	0%	3	12%	3	12%
45-49	0	0%	3	12%	3	12%
50-54	1	4%	2	8%	3	12%
55-59	0	0%	0	0%	0	0%
60-64	0	0%	2	8%	2	8%
65-69	0	0%	0	0%	0	0%
70-74	1	4%	3	12%	4	16%
Total	**4**	**8%**	**21**	**84%**	**25**	**100%**
Average	**44.50 ≈ 45**		**43.62 ≈ 44**		**43.76 ≈ 44**	

Table 1 Patient demographics.

Table 2 demonstrates that 5 patients underwent additional procedures at the same time as the tailor's bunion repair. One patient (4%) had one concurrent procedure and 4 patients (16%) had two additional concurrent procedures. These additional procedures included HAV repair by scarf and Akin osteotomies; repair of lesser toes deformities: hammer toes by 2nd, 4th and 5th digit excisional arthroplasty and a Lapidus procedure for treatment of concurrent hypermobile HAV. Patients' health status was summarised by the American Society of Anaesthesiologists (ASA). ASA grade 1 accounted for 80% of patients and ASA grade 2 accounted for the remaining 20% which suggests that the patients who had the procedure were generally normal and healthy with only mild systemic diseases.

	Count (N)	Count (%)
Total no. of procedures	**25**	**100%**
ASA Grade 1	**20**	**80%**
ASA Grade 2	**5**	**20%**
Patients receiving ≥ procedure	**5**	**20%**
Patient (s) receiving 1 concurrent procedure	**1**	**4%**
Patient (s) receiving 2 concurrent procedure	**4**	**16%**
Additional concurrent procedure (s):		
scarf and Akin osteotomy	**3**	**12%**
Arthrodesis 1st MTPJ	**1**	**4%**
Excisional arthroplasty 2nd digit	**2**	**8%**
Excisional arthroplasty 4th digit	**1**	**4%**
Excisional arthroplasty 5th digit	**1**	**4%**
Lapidus 1st metatarsal-cuneiform joint	**1**	**4%**

Table 2 Summary of procedure (s) performed / ASA grades.

PASCOM-10 Surgical Treatment Event	Count (N)	Count (%)
Patients recorded as Discharged	**18**	**72%**
Patient not recorded as Discharged	**7**	**28%**
Total no. of sample	**25**	**100%**
No observed sequella	**10**	**40%**
Procedure related complications: (resolved and discharged in all cases)	**6**	**24%**
Thickened scar line or painful (SCR) Pain: Scar line hypertrophy / Keloid may not be painful	**5**	**20%**
Pain at site of surgery (PNSS): Surgical site beyond six weeks	**1**	**4%**
Non-related procedure complications	**2**	**8%**
Wound dehiscence recorded for Arthroplasty of 4th distal interphalangeal joint (IPJ)	**1**	**4%**
Iatrogenic: Surgery failed e.g recurrence, floating toe, hallux varus recorded for Athroplasty of 2nd proximal IPJ	**1**	**4%**
Total no. of patients who had complications	**8**	**25%**

Table 3 Surgical Sequelae recorded postoperative.

Any complications recorded at the end of postoperative period on PASCOM-10 is summarised in Table 3. 18 patients (72%) were discharged, of which, 10 (40%) had no postoperative sequelae; 6 (24%) patients had complications relating to the fifth metatarsal scarf osteotomy and; 2 (8%) patients had complications that were not related to the procedure. All 8 (32%) patients who presented with complications have been recorded as discharged. However, clinical decision status for 7 (28%) patients were not recorded thereby, it was unclear if these patients were discharged with or without any complications.

Responsiveness of MOXFQ

As shown on Table 4, the p-values (two-sided) for the W/S, P and SI differences are all <0.001. Therefore, in each domain, the authors have observed a highly significant pre-post difference. The null hypothesis of no effect can thus be rejected in all domains. In the W/S domain, the mean pre-MOXFQ score was 54.7 (SD 21.3), the post-MOXFQ score reduced to 20.2 (SD 27.6). For the P domain, score was reduced from 60.4 (SD 17.9) to 22.2 (SD 21.4) and in the SI category, 50.4 (SD 19.5) to 6.7 (SD 11.2) respectively. A 95% confidence interval for the difference was given by (22.786, 46.254) in W/S; (29.507, 46.893) in P and; (34.534, 52.826) in SI.

Responsiveness of PSQ-10

The mean PSQ-10 score in Table 5 for the cohort was 88.08 with the majority of patients (88%) scoring between 81 and 100 which suggests that good surgical outcomes can be achieved with the fifth metatarsal scarf osteotomy.

The majority of patients (96%) as shown in Table 6 recorded 'pain relief' in their response. 'Improved mobility' accounted for 16% and 'better footwear' 8%. 'Improved cosmesis' and 'Others' counts occurred less commonly, accounting for 4% respectively.

MOXFQ scores with associated difference scores, 95% confidence interval and p-values.								
Domain	**Pre-mean**	**Pre-SD**	**Post-mean**	**Post -SD**	**Difference Mean**	**Difference SD**	**95% Confidence interval**	**P-value**
W/S	54.68	21.268	20.16	27.559	34.520	28.427	(22.786, 46.254)	<0.001
P	60.40	17.907	22.20	21.413	38.200	21.059	(29.507, 46.893)	<0.001
SI	50.36	19.506	6.68	11.190	43.680	22.156	(34.534, 52.826)	<0.001

Table 4 Summary of MOXFQ scores with associated difference scores, 95% confidence interval and p-values.

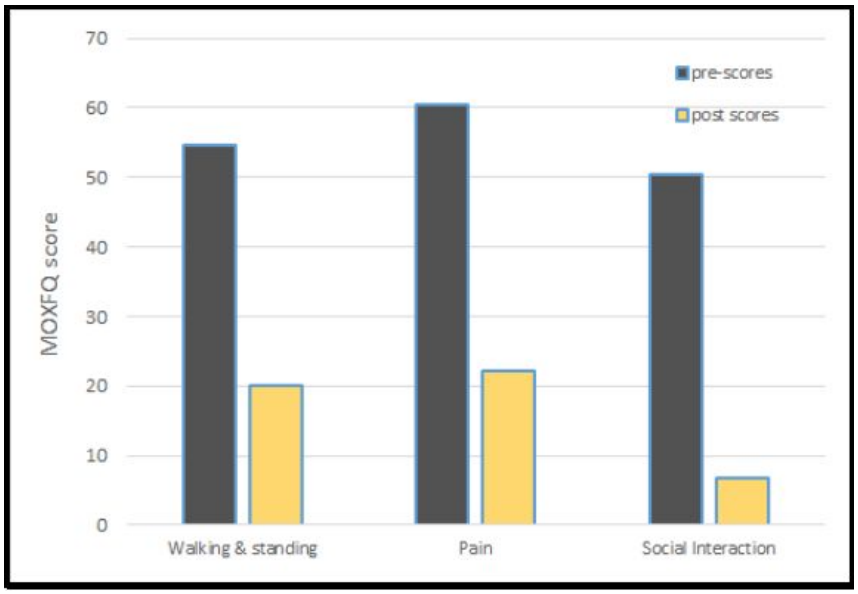

Figure 3 Pre/post op comparative MOXFQ distribution. The graph illustrates a significant improvement across the three MOXFQ domains of W/S,P and SI following the procedure. Higher scores in preoperative MOXFQ scores denote greater severity.

Band	Count (N)	Count (%)
1-10		
11-20		
21-30		
31-40		
41-50		
51-60	1	4%
61-70		
71-80	2	8%
81-90	7	28%
91-100	15	60%
Total sample size	25	100%
Mean PSQ-10 Scores	88.08	

Table 5 PSQ-10 Score distribution.

Pain relief	Improved mobility	Better footwear	Improved cosmesis	Others
24 (96%)	4 (16%)	2 (8%)	1 (4%)	1 (4%)

Table 6 Total counts for each PSQ010 question 1 response (percentage of all themes).

Question 2-10		n.	%
Qn. 2	**Patient who stated the risks and possible complications of surgery have been explained to them prior to surgery**	25	100%
Qn. 3	**Patients who stated they know what to do should a problem arise after postoperatively**	25	100%
Qn. 4	**Patients who stated they have had problems postoperatively**		
	No	17	68%
	Yes, minor	6	24%
	Yes, major	2	8%
Qn. 5	**Patients who stated some postoperative pain but coped, and those who had minimal or no pain.**	25	100%
Qn. 6	**Patients who returned to footwear by 2 weeks**	5	20%
	Patients who returned to footwear by 4 weeks	11	44%
	Patients who returned to footwear by 6 weeks	2	8%
	Patients who returned to footwear by 8 weeks	4	16%
	Patients who returned to footwear by 12 weeks	1	4%
	Patients who returned to footwear by 6 months	2	8%
Qn. 7	**Patients who described no discomfort or any occasional twinges from their original foot condition**	20	80%
Qn. 8	**Patients who described their foot condition was better or much better following surgery**	24	96%
	Patients who stated their foot condition deteriorated or a little worse following surgery	0	0%
Qn. 9	**Patients who stated they would have the surgery again under the same conditions**	22	88%
Qn. 10	**Patients whose expectations were met or partly met**	25	100%

Table 7 Summary of answers to key PSQ-10 question 2-10.

Radiographic Analysis

The results of the radiographic analysis for both 5-MTPA and 4-5 IMA are displayed in Table 9. The mean pre 5-MTPA measurement was 19.8 (SD 5.1), the post 5-MTPA measurement reduced to 8.0 (SD 3.1). For the mean 4-5 IMA measurement, it was reduced from 11.6 (SD 1.9) to 5.7 (SD 1.7). Post-operative mean scores of both 5-MTPA and 4-5 IMA fell within the normal angle range for non-pathological foot. A 95% confidence interval for the difference was given by (9.65338, 13.90662) in 5-MTPA and (4.72395, 6.88405) in 4-5 IMA. Improvement of both evaluated angles was highly statistically significant (p-values < 0.001).

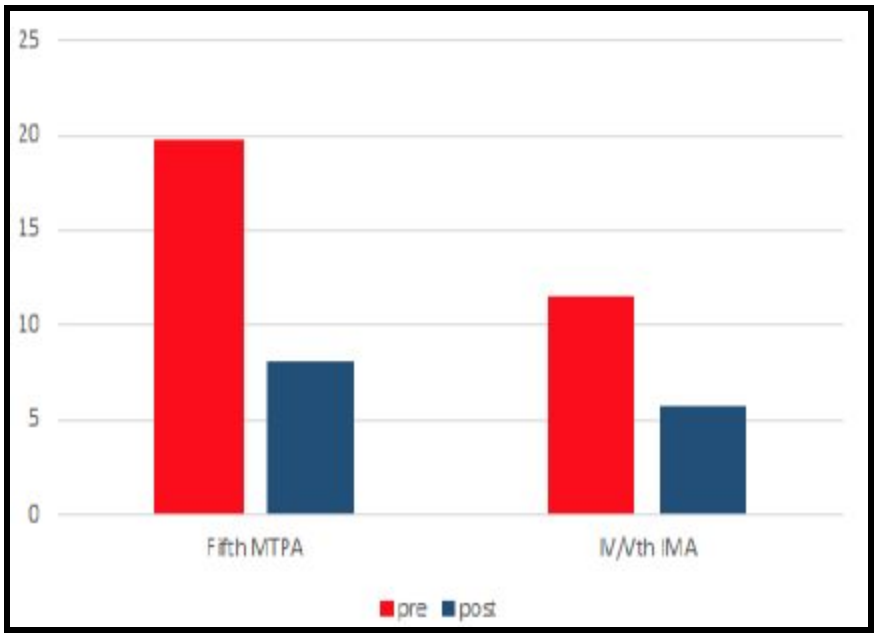

Figure 5 Illustrates the significant improvement of the radiographic measurements for both 5- MTPA and 4-5 IMA postoperatively.

XRAY angles	Pre-mean	Pre-SD	Post-mean	Post-SD	Difference Mean	Difference Std. Deviation	95% Confidence interval	P-value
5-MTPA	19.8120	5.05423	8.0320	3.13325	11.78000	5.15194	(9.65338,19.0662)	<0.001
4-5 IMA	11.5520	1.94489	5.7480	1.69118	5.80400	2.61653	(4.72395, 6.88405)	<0.001

Table 9 Radiological measurement scores with associated difference scores, 95% confidence interval and p-values.

Discussion

The prevalence of tailor's bunion in the general population is still unknown, although existing literature suggests that the deformity mostly occurs in adults in their 40s and 50s and affects women more than men [35,36]. This is also reflected in the demographic data found in this study (Table 1); a vast majority of patients (84%) are female with an average age of 43.6 y/o (1.dp). Many studies have in fact found women are most likely to suffer with foot pain more than men as not only do they have higher familial tendency to development of structural forefoot deformities, but have also been observed to wear shoes that were too small for their feet [15,18,36]. Increased pressure from shoes over the

prominence of the fifth metatarsal head can cause irritation, pain and development of skin lesions such as calluses and corns [35].

The results of the MOXFQ scores in this review showed significant improvement of more than 50% decrease postoperatively with the procedure in all three domains (W/S, P, SI). For the study population, the outcomes obtained demonstrated that the changes for the three MOXFQ domains are beyond the measurement error on a 95% confidence level hence can be interpreted as true changes. Furthermore, the score changes obtained have all exceeded Dawson's estimated Minimal Clinically Important Differences (MCID) value of W/S, 12 in P and 24 in SI [11]. Scores exceeding the MCID are known to be clinically relevant [11]. This paper also found the procedure clinically effective with high levels of patient satisfaction and improved quality of life as reflected by a mean PSQ-10 score of 88.08 with the majority of patients (88%) scoring between 81 and 100. The high level of subjective satisfaction would be consistent with previous studies which also proved good results with the diaphyseal osteotomy procedure [3,19,22,25,41]. High patient satisfaction was further indicated by results of question 10 of the PSQ-10 where all the patients' original expectations of surgery had been met or partly met; question 7 where 80% of patients described no discomfort or any occasional twinges from their original foot condition and question 8 where 24 (96%) patients described their foot condition as better or much better.

Patients scored highest for concerns relating to foot pain in comparison to other domains preoperatively on the MOXFQ. This correlates with their response on PSQ-10 question 1 taken at a 6 month postoperative review; where 'pain relief' accounted for 24 (96%) of patients' expectation. This could be due to how services operate in the public sector; in that, cosmetic surgery is not routinely provided on the NHS and, indication for any surgical intervention is only warranted if the pathology presented is symptomatic [31]. While the interpretation of patients' expectations can be challenging and varies depending on time, health and environmental factors [44]. The PROMs results obtained from this study are similar to other studies in that patients attending for foot surgery generally expect pain relief, followed by improved mobility and shoe fitting [26,44].

Acute postoperative pain is most commonly reported by patients following surgery [23]. Although this could deter patients from undergoing surgery again, 88% of patients from this study (Table 7) stated they would have the surgery again under the same conditions, should the need arise. Furthermore, question 5 of the PSQ-10 shows that 92% of patients reported no or minimal pain, with the remaining 8% reporting having some pain but were able to cope. This suggests that a combination of popliteal nerve block with a three day course of oral analgesia (paracetamol, non-steroidal anti-inflammatory drug (NSAID) and weak opioid) is well tolerated by patients with adequate effects.

From the 25 operated feet, there were no reported intra-operative complications and 6 cases of minor postoperative procedure associated complications. This was recorded on PASCOM-10 as 'a scar line hypertrophy/keloid which may not be painful' in 5 cases and pain in the surgical site beyond six weeks in 1 case. These findings now form a part of the consenting process for future patients undergoing this procedure. The two other cases of postoperative sequelae recorded were not a direct complication of the fifth metatarsal scarf, but rather of another procedure performed in the same episode. Overall, this paper recorded low complications which supports findings from systematic and meta-analysis study by Martijn, et al., [29] which reviewed complications arising from proximal, diaphyseal and distal osteotomies for correction of tailor's bunion and found very low complication rates with diaphyseal osteotomies [29]. Some of the complications recorded on their study included hardware complications (i.e., removal of screws fixation, screw breakage/migrations), painful scar, delayed or non-union, infection and a revision surgery. None of these complications were recorded in this study. Other general postoperative complications such as deep vein thrombosis or pulmonary embolism were also not recorded.

When returning to normal footwear postoperatively, 5 patients returned at 2 weeks, 11 patients at 4 weeks, 2 patients at 6 weeks and 4 patients at 8 weeks, however, 1 patient required 12 weeks and 2 patients required 6 months. The total number of patients who returned by the eighth week was 22 (88%) suggesting the use of two countersunk screws provides sufficient stability thus enabling guarded weightbearing in normal footwear. Although there is currently no research which specifically looked into the mechanical strength of fifth metatarsal scarf osteotomies for correction of tailor's bunion utilizing one or two screws, the positive results of this study is comparable

to all the other studies which utilised screws in their diaphyseal osteotomies [3,19,22,25,41]. The procedure also allows for structural correction of increased 5-MTPA and 4-5 IMA. Radiographic analyses in this study revealed significant improvements in these angles which suggest the procedure has value in obtaining promising correction results in patients with widened 4-5 IMA. Despite the differing weight bearing status between pre- and postoperative films, the radiographic improvement findings are similar to other studies [3,19,22,25,41].

Finally, this review achieved 100% for question 2 of the PSQ-10 which asks patients if the risks and possible complications of surgery were explained to them preoperatively. This strongly indicates that there is a robust consenting process employed by the department - thereby protecting patients from unwanted medical intervention, and also safeguards their rights to autonomy, self-determination and inviolability [20]. This is also reflected on the Standards of Proficiency for podiatrist practicing podiatric surgery section 1.6; which recognizes the importance of delivering clear communication with patients and to ensure that they are fully informed of the proposed treatment benefits, risks and consequences [21]. Especially in the field of surgery, this information may be of relevance to patients' decision making on the treatment choice and who they wish to seek treatment from [4].

Strengths and Limitations

This service review has a few limitations. It is retrospective in design which sits on the lower levels of evidence hierarchy [32]. It is also limited by a small study sample size as the cohort was determined by timeframes and tailor's bunions are relatively uncommon compared to other foot and ankle pathologies and, as 28% patients' final treatment episode on PASCOM-10 were missing thereby, risking a possibility of failing to pick up any complications and concerns. Lastly, the differing weight bearing status of pre- and postoperative films could lead to inaccuracy in radiographic tailor's bunion angular evaluation following the surgery.

The authors believe that the study has taken a novel approach to evaluating diaphyseal osteotomy procedure by not just utilizing clinical outcomes and radiographic evaluations, but most importantly, has employed both MOXFQ and PSQ-10 functional outcomes instruments known for their sensitivity, reliability and validity when assessing PROMs [12]. In contrast to AOFAS, MOXFQ and PSQ-10 incorporate both subjective and objective components [11]. Furthermore, by using PASCOM-10, the data was easily extracted while keeping patient/service users' information confidential. PASCOM-10 enables its users to collect anonymous or pseudo anonymous data related to the selected cohort of patients who underwent a specific procedure [7].

Conclusion

This service evaluation demonstrates that the fifth metatarsal scarf osteotomy provides good clinical outcomes, is able to address a range of angular deformity and has low complication rates associated with the procedure. The use of two screws for fixation potentially enhances stability of the osteotomy and allows for early mobilisation following the surgery.

It also highlights the key role of MOXFQ and PSQ-10 PROMs instruments when determining patient satisfaction with the services received alongside the clinical outcomes. It is important to recognise that the isolated use of objective clinical outcomes following surgery can overlook factors which are pertinent to patients and the contribution patients' perspective can have in healthcare appraisal [12]. Therefore, it is in the interest of the surgical team to know how well they are meeting the needs of their patients in a meaningful way utilizing reliable and valid PROMs instruments to provide them with the information needed to assess the quality and outcome of care.

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