Arthroscopic Findings in Refractory Symptomatic Fourth and Fifth Tarsometatarsal Joints

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Statement of Purpose

- Refractory pain from the fourth and fifth tarsometatarsal (TMT) joints has be a source of disability and functional impairment.
- Prevalence of TMTJ arthritis has been estimated approximately 4.7% in patients between the ages of 45 – 64 years of age. (1)
- While pain has been attributed to injury, post-traumatic arthritis and arthrofibrosis, the principal causes of pain in the absence of arthritis are not well elucidated.
- The purpose of this study is to characterize arthroscopic pathology associated with chronic refractory pain localized to the fourth and fifth TMT joints.

Methodology & Procedures

- Twenty-four patients that underwent arthroscopic surgery of the fourth and fifth TMT joints for recalcitrant pain between 2015 – 2019 at the University of Texas Southwestern Medical Center and Parkland Memorial Hospital, Dallas, Texas were included in the analysis.
- Piano key test was performed in all patients to verify the clinical source of pain at the TMT joint. (2)
- The Outerbridge classification (3) was used for arthroscopic grading of chondral lesions.
- Kellgren Lawrence (KL) Classification (4) was used to radiographically grade osteoarthritis.
- Arthroscopic soft tissue lesions were reported as acute hypertrophic synovitis, chronic synovial fibrosis, hyaline bands, meniscoid bodies, loose joint bodies, arthrofibrosis.
- The P3-4 (portal between third and fourth TMT joint and the lateral portal (portal lateral to the fifth TMT joint) are placed as described by Lui. (5)
- A 2.7 mm 30 degree arthroscope was placed in the P3-4 portal. Debridement was performed with 2.5 mm aggressive soft tissue shaver through the lateral portal as shown in Figure 1 and 2. Arthroscopy pump was used for fluid management at 25-30 mmHg of pressure and 30% flow.

Results

- Forty-five TMT joints (21 fourth TMT joints, 24 fifth TMT joints) in 24 patients underwent arthroscopic surgery for refractory pain.
- There were 21 female (87.5%) and three male (12.5%) subjects with average age of 62.5±8.6 (SD). Average body mass index (BMI) was 31.2±5.0 kg/m² (SD).

TABLE 1. Summary of Kellgren Lawrence (KL) radiographic classification for arthritis seen in the fourth and fifth TMT joints.

KL Grade	4th Tarsometatarsal joint (percent)	5th Tarsometatarsal joint (percent)
0	6 (28.57)	8 (30)
1	0 (0)	4 (16.67)
2	8 (38.10)	11 (45.83)
3	7 (33)	1 (4.17)
4	0 (0)	0 (0)

TABLE 2. Summary of Outerbridge classification for chondral lesions seen in the fourth and fifth tarsometatarsal joints.

Outerbridge Classification	4th Tarsometatarsal joint (percent)	5th Tarsometatarsal joint (percent)
0	6 (25%)	6 (25%)
1	2 (8.33%)	1 (4.17%)
2	7 (29.17%)	3 (12.5%)
3	5 (20.83%)	5 (20.83%)
4	4 (16.67%)	7 (29.17%)

Results

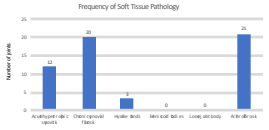

Figure 7. Frequency plot of soft tissue pathologies seen arthroscopically in the fourth and fifth TMT joints.

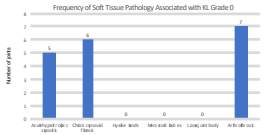

Figure 8. Frequency plot of soft tissue pathologies seen arthroscopically in the fourth and fifth TMT joints associated with Kellgren Lawrence (KL) Classification 0 (No radiographic evidence of arthritis).

Figure 1. Arthroscopic access to the fourth and fifth TMT joints through the P3-4 and lateral portal.

Figure 2. Fluoroscopic view demonstrating placement of arthroscopic camera lens in the P3-4 portal and shaver in the lateral portal.

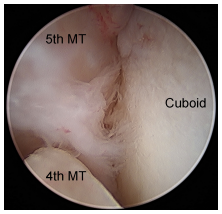

Figure 3. Arthroscopic view of the fourth and fifth TMT joint with acute and chronic synovial fibrosis causing joint impingement centrally.

Figure 4. Arthroscopic view of the fourth TMT joint acute hypertrophic synovitis causing joint impingement.

Figure 5. Arthroscopic view of the fourth and fifth tarsometatarsal joint with arthrofibrosis.

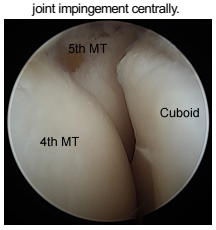

Figure 6. Arthroscopic view post-debridement of soft tissue impingement.

Analysis & Discussion

- Approximately, 31 of 45 TMT joints (69%) presented with radiographic evidence of arthritis seen in Table 1.
- Approximately 75% of the fourth and 75% of the fifth TMT joints had evidence of a chondral lesion. The most common chondral lesion for the fourth TMT joint was superficial fissures (25%) while chondral lesion with exposed subchondral bone was most common at the fifth TMT joint (29.2%) shown in Table 2.
- Chronic synovial fibrosis and arthrofibrosis were the most common soft tissue impingement lesions observed arthroscopically as shown in Figures 3, 5 and 7.
- Approximately, two-thirds of joints in our series that were arthroscopically assessed had associated radiographic evidence of arthritis.
- **Of the one-third of the joints (14 of 45 TMT joints) that did not have radiographic signs of arthritis (KL grade 0), arthrofibrosis was observed in 87.5% of these patients, chronic synovial fibrosis in 75.0%, and acute hypertrophic synovitis in 62.5% as shown in Figures 3, 5, 7 and 8.**
- **This is the first study to report arthroscopic pathologies associated with refractory pain localized to the fourth and fifth TMT joints.**
- Future studies with patient reported outcomes and correlative analysis of associated soft tissue pathologies would help to determine if arthroscopic surgery could improve patient function and quality of life.

References

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