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Purpose

Late stage arthrosis can be extremely debilitating in the foot and ankle. Arthrosis in the tarsometatarsal joints (TMTJ) can occur from previous low-energy or high-energy trauma to these joints. The purpose of this study is to present the outcomes in patients who had lateral column TMTJ fusions with late stage LisFranc arthrosis.

Methods/ Hypothesis

A retrospective chart review was done on 21 patients who had previous tarsometatarsal joint trauma that resulted with a fusion at the 4th and 5th metatarsal cuboid joint. Of the 21 patients, 11 were male and 10 were female. Ages ranged from 35 to 77 with an average of 57.6. Patients' BMI's ranged from 19.1 to 30.1 and averaged 25.2. Our follow up for all patients was no less than 29 weeks and averaged 53.9 weeks. In our chart review, we assessed what type of treatment that had taken place previous to lateral column fusion. If a complete TMTJ fusion or complete lateral column fusion were performed. We reviewed treatments for compartment syndrome from initial trauma, previous surgery prior to fusion of the 4th and 5th metatarsal cuboid joint, primary fusion following initial trauma, failed exostectomy, failed injections and failed surgical tendon interposition. We also looked at whether the patient had surrounding joint osteoarthritis and limited motion prior to fusion. Patient satisfaction was obtained by using the ACFAS Universal Evaluation Scoring Scale Module: 2 Forefoot (excluding first ray) preoperatively, post operatively at 12 and 24 months, and then comparing the results of the pre-operative findings with those reported at 12 and 24 months post-operative. The scores of the 12-month follow up were also compared with those scores at 24 months post-operative. The 0-10 Numeric Pain Rating Scale was used to determine if the procedure benefited for pain relief. Pre-operative pain score results were compared with 24 month post-operative results. P-values were obtained by using a two tail T test, to find if our results were significant.

Procedure

For patients with late stage LisFranc arthrosis, a fusion of the 4th and 5th tarsometatarsal joint was performed. This was done in conjunction with a complete TMTJ fusion in a select number of patients, and a complete lateral column fusion in other patients.



Literature Review

Arthrosis in the tarsometatarsal joints (TMTJ) can occur from previous low energy or high-energy trauma to these joints. Injuries to the TMTJ occur in approximately 1 in 55,000 people per year, accounting for 0.2% of all fractures. ^(1,2) The mechanism of injury for these fractures is either direct or indirect trauma. Direct trauma involves a crushing-type injury, most likely to create a plantar dislocation of the metatarsals. ⁽²⁾ Indirect trauma is secondary to a rotational-type force across the joint with the eversion/pronation type being the most common. ⁽²⁾ There has been some debate and controversy on whether one should fuse the lateral column after complications from injury. Fusions of the lateral column can include the calcaneocuboid joint (CCJ), the CCJ and the 4th and 5th metatarsal cuboid joint, or solely the 4th and 5th metatarsal cuboid joint. Fusions of the TMTJ can be partial or complete. Chang and Soomekh ⁽³⁾ submit that they have noticed a better functional outcome when the three medial joints are fused in comparison to a complete arthrodesis of 1 to 5. They further explain, that fusion of the 4th and 5th metatarsals to the cuboid may be problematic, because the majority of lateral column motion comes out of the 4th and 5th metatarsal cuboid joint in the sagittal plane. ⁽³⁾ Whereas, Panagakos et al. stated that they have performed both partial and complete arthrodesis of the LisFranc joint complex, and in their experience there are insignificant differences after surgery in the patients' pain level or return to normal function between the two groups. ⁽¹⁾ They agree with Treadwell and Khan, who found that there was no correlation between the number of joints fused and the functional outcome. ⁽⁴⁾

Results

Of the 21 patients reviewed, all had a traumatic event to the Lisfranc joint complex and 5 were treated for compartment syndrome. All of the patients had previous surgery prior to fusion, but none of the patients had primary fusion of the 4th and 5th metatarsal cuboid joint following the initial trauma. All patients failed steroid injections, 12 failed exostectomy, and 4 failed tendon interposition. None of the patients received an insolated 4th and 5th metatarsal cuboid joint fusion, but all were either part of a complete lateral column fusion or a complete TMTJ fusion. 100% of patients had surrounding joint osteoarthritis and limited motion, prior to fusion, and 3 were hypermobile.

Status post lateral column fusion, the average time to radiographic union was 11.6 weeks and the patient was able to return to shoes and full weight bearing at 12.1 weeks. The average score of the ACFAS Universal Evaluation Scoring Scale pre-operatively was 64.6, post-operatively at 12 months was 80.3, and post-operatively at 24 months was 83.9. When comparing the pre-operative ACFAS score to the 12-month follow up (p-value 1.15 E-36) and the 24 month follow up (5.05 E-35), and the 12-month to the 24 month follow up (5.03 E-45), all were found to be statistically significant. The Numeric Pain Rating Scale averaged pre-operatively at 8.7 and 24 months post-operatively at 2.7. This difference in the pain rating scale was also significant (8.42 E-14).



Analysis/ Discussion

In reviewing the literature on lateral column fusion, we understand that this procedure is not popular as a primary approach to Lisfranc trauma to the lateral column. There exist other alternative procedures that surgeons can possibly do to gain a positive result and alleviate pain. In regards to late stage Lisfranc arthrosis, our study showed that every post-operative ACFAS score at 12 and 24 months was significantly higher than the patients' pre-operative scores. 100% of the post-operative pain scores were significantly less than the pre-operative scores. We conclude that lateral column fusion of the 4th and 5th metatarsal cuboid joint, as part of a total TMTJ fusion or complete lateral column fusion, is an effective and pain-reducing procedure for patients who have late stage Lisfranc arthrosis.

References

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