Comparison of Radiographic Outcomes Between Dynamic Medial Column Stabilization and Lateral Column Lengthening.

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Introduction/Purpose: Lateral column lengthening (LCL) has been recognized as a most effective surgical treatment for flexible flatfoot. But the LCL is known to be associated with many complications, which are lateral foot pain or calcaneocuboid arthrosis. In order to correct flexible flatfoot without these complications, we have developed a novel technique-dynamic medial column stabilization (dynamic-MCS). The dynamic-MCS consists of flexor hallucis longus transfer to the medial cuneiform, arthrodesis of first tarsometatarsal joint and medial displacement calcaneal osteotomy. The dynamic-MCS had different mechanism from the LCL. The dynamic-MCS directly restores longitudinal arch of flexible flatfoot, while the LCL indirectly restores the longitudinal arch. The purpose of this study is to investigate difference of radiographic outcomes between the dynamic-MCS and the LCL.

Methods: Dynamic-MCS group included 16 flexible flatfeet of 16 patients which were treated with the dynamic-MCS from January 2014 to February 2015. The LCL group included 23 flexible flatfeet of 21 patients which were treated with the LCL from January 2011 to January 2014. A single surgeon performed the dynamic-MCS and the LCL in our clinic. We retrospectively evaluated radiological outcomes of the dynamic-MCS group and the LCL group. The preoperative and postoperative radiographic parameters were measured. Talonavicular coverage angle was measured on plain weight-bearing anteroposterior radiograph. Calcaneal pitch, talocalcaneal angle, talar angle, meary angle and 1st metatarsal declination angle were measured on plain weight-bearing lateral radiograph. Hindfoot alignment angle was measured on hindfoot alignment view. We compared postoperative improvements of the dynamic-MCS group with those of the LCL group in each radiographic parameters. All the postoperative values were obtained at the last follow-up.
Results: The average age in the dynamic-MCS group was 41 years (95% CI: 33.5-47.9) and mean follow-up period was 12.9 months (minimum 10 months). The average age in the LCL group was 36 years (95% CI: 27.9-43.1) and mean follow-up period was 22.2 months (minimum 12 months). The talonavicular coverage angle (P=0.002) and calcaneal pitch (P=0.002) of the LCL group showed significant higher improvement than that of the dynamic-MCS group. The talocalcaneal angle (P=0.030) and hindfoot alignment angle (P=0.005) of the dynamic-MCS group showed significant higher improvement than that of the LCL group. The improvement of the other radiographic parameters showed no significant difference between the dynamic-MCS group and the LCL group (Fig 1-B).

Conclusion: Radiographic outcomes between the dynamic-MCS and the LCL were different for flatfoot correction in this study. The LCL showed higher correction of forefoot abduction than the dynamic-MCS. The dynamic-MCS showed higher correction of heel valgus than the LCL. Correction of flat longitudinal arch was not different between the dynamic-MCS and the LCL. To restore the flat longitudinal arch, the dynamic-MCS corrected the plantar-flexed talus and the LCL corrected the low calcaneal pitch. Lateral plantar pain and calcaneocuboid arthrosis did not occurred after the dynamic-MCS in our experience. We concluded that the dynamic-MCS could be a good treatment option for flexible flatfoot.