Posterior ankle impingement syndrome among athletes: clinical features, characteristics, and clinical results.

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INTRODUCTION:

Posterior ankle impingement syndrome (PAIS) is described as clinical disorders characterized by posterior ankle pain during plantar flexion of the ankle. The pain is usually aggravated by repetitive plantar flexion, or hyper plantar flexion of the ankle. Therefore, PAIS is often observed among athletes who are required to forcefully or repeatedly plantar flex the ankle. Thus, it is commonly reported in athletes such as ballet dancers, and soccer players. However, there seems to be a lack of information about the details of the clinical features and characteristics, such as concomitant pathologies, level of athletes and their clinical outcomes. To elucidate the overall picture of the pathology of the syndrome and its features, a large-scale study is required.

The purpose of this study was to investigate the details of PAIS among athletes and reveal its characteristics.

METHODS: The study was conducted as a retrospective study, reviewing the clinical records of the athletes who visited affiliated clinics and hospitals and were diagnosed as PAIS from April 2014 to March 2023. The study was approved by the institutional review board of the affiliated clinic. Athletes' gender, age at the initial diagnosis, participating sports, level of competition (professional, amateur, recreational, and student), definitive diagnosis, concomitant pathologies, affected side, surgical cases, pre-operative pain duration (weeks), pre- and post-operative Japanese Society for Surgery of the Foot Ankle/Hindfoot Scale (JSSF Scale), post-operative complications and days of return-to-training and return-to-sports were evaluated. Comparison between pre- and post-operative JSSF Scale was statistically analyzed using oneway ANOVA. Relationship between pre-operative pain duration and days of return-to-training and return-to-sports was statistically analyzed using Spearman's rank correlation coefficient.For both analysis, *P* value of <.05 was considered to be statistically significant.

RESULTS: During the reviewing period, a total of 267 ankles (132 males, 135 females, average age of 21.4 years) from 240 athletes were diagnosed as PAIS. The most common sport was ballet dancers (100 athletes, 37.4%), followed by soccer (51 athletes, 19.1%), rugby (15 athletes, 5.2%), baseball (13 athletes, 4.9%), and basketball (11 athletes, 4.1%). Student athletes was the most with 152 athletes (56.8%) followed by professional athletes (74, 27.8%), amateur athletes (26, 9.7%), and recreational athletes (15, 5.6%). Definitive diagnosis was bony impingement (included os trigonum, hypertrophic posterior talar process, and loose body) for 221 ankles (82.8%) and the rest was soft-tissue impingement. The most common concomitant pathology was pathologies involving flexor hallucis longus (FHL) (125 ankles) followed by synovitis (79 ankles). Number of athletes who suffered on the dominant side (dominant hand or foot according to the participating sports) was 164 (61.7%). A total of 147 athletes (55.1%) had surgery, which were all performed arthroscopically. Among the surgical cases, ballet dancers (56 athletes, 56% of the total ballet dancers) were the most, followed by soccer (33 athletes, 64.7%), rugby (12 athletes, 80%), and basketball (7 athletes, 63.6%) and swimming (7 athletes, 77.8%). As for the competition level, student athletes accounted the most with 85 (57.8%) followed by professional athletes with 45 (30.6%), amateur athletes with 13 (8.8%), and recreational athletes with 4 (2.7%). Preoperative JSSF Scale of 83.9 points significantly improved post-operatively to 99.4 points (P < 0.00001). The most common concomitant surgery was resection of the FHL tendon sheath with 96 ankles (65.7%), followed by synovectomy in 53 ankles (36.1%). There were 6 cases of post-operative complications (4.1%), with one mild infection which healed by oral anti-biotics and others were surgical site pain. Average pre-operative pain duration was 51.9 ± 53.7 weeks. Average days of return-to-training and return-to-sport was 44.3 ± 15.8, and 94.8 ± 26.7 days, respectively. Duration of preoperative pain significantly correlated with days of return-to-training and return-to-sports (r = 0.24, P = 0.009, and r = 0.43, P < 0.001, respectively). There were no recurrent cases with all the athletes returning to the previous competition level.

DISCUSSION AND CONCLUSION:

This study, which consisted over 200 PAIS athletes, is the only large-scale study besides Zwiers' report in 2018. By reviewing in large-scale, we were able to reveal the details of the clinical features and characteristics of athletes with PAIS. Similar to the previous studies, our study also showed that the common athletes presenting PAIS was ballet dancers and soccer players. It has been reported that several pathologies combine with PAIS and this study revealed that pathologies related to FHL was the most frequent, along with the concomitant surgery among those who underwent arthroscopic surgery. This supports several previous studies, which reported that the FHL pathology was one of the most commonly observed pathologies among PAIS patients. Over 50% of the athletes were surgically treated with arthroscopy, which was very satisfying in clinical results with low complication rates. This result falls in line with the past literatures,

which reports a high success rate with low complication rates, especially those performed arthroscopically. Past study has reported that there was a significant correlation between the length of symptoms preoperatively and return to training and return to play. As our study also showed a significant correlation between pre-operative pain duration and returning to the field in surgical cases, determination of performing surgeries for failed conservative cases are extremely important for earlier return-to-sports.

Large-scale evaluation was conducted for athletes with PAIS. This study revealed the details of clinical features and characteristics of posterior ankle impingement syndrome in athletes, including those of surgical cases and its post-operative results.