Return to Sports and Physical Activity following Flatfoot Reconstruction

Robert Fuller[1], Stephanie Kathryn Eble[2], Jonathan Day, Agnes D Cororaton, Lavan Rajan, Scott Ellis[3]
[1]Foot and Ankle Orthopedics, [2]Hospital For Special Surgery, [3]Hosp for Special Surg-Cornell

INTRODUCTION:

Progressive collapsing foot deformity (PCFD) is a debilitating condition encompassing a number of interrelated, progressive deformities, requiring differing combinations of bony and soft tissue procedures to restore the medial arch, neutralize heel alignment, address posterior tibial tendon **(**PTT) insufficiency, and correct forefoot abduction. Patients are often debilitated by these injuries with postoperative goals commonly cited as walking and low impact activities without pain. However, some patients engage in sports and more rigorous activities. At times, a surgeon may struggle to set expectations after surgery since few studies investigate returns to activity following flatfoot reconstruction and every patient is different. Existing studies are limited by small sample sizes, lack of data on specific sports and activities, and patient populations confined to one or two of the many possible concomitant procedures in flatfoot reconstruction. This study aims to provide the first generalizable assessment of returns to sports and physical activity following reconstruction surgery in patients with flexible flatfoot deformity.

METHODS:

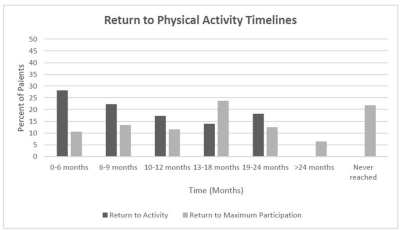
Patients aged 18 to 60 who underwent reconstructive surgery between February 2016 and May 2019 for flexible-stage flatfoot deformity were identified by registry review and contacted with IRB approval. Seventy of 119 eligible patients (72/121 feet, 60%) were reached for follow up at mean 3.1 (range, 2.0 to 5.4) years with mean age 43.5 (range, 18 to 59) years. All concomitant procedures were noted. Physical activity was evaluated with a previously developed questionnaire that assessed participation in 15 sports and activities before and after surgery, allowed patients to list additional activities, and classified activities as high or low-impact. Patients were asked to specify postoperative number of sessions per week, session duration, return times to participation and maximal activity, relative postoperative vs. preoperative difficulty, and satisfaction with outcome regarding physical activities. Clinical outcomes were evaluated with Patient-Reported Outcomes Measurement Information System (PROMIS) scores. Multivariable regression models were used to test associations between changes in PROMIS domains and sport participation survey responses, controlling for age and BMI, and to test association of sports participation with the four most commonly performed procedures after controlling for concomitant procedures.

RESULTS:

Patients experienced significant improvements in all PROMIS domains except Depression. Physical Function improved by 8.1 points (41.3-49.4, $p<0.001$), Pain Interference by 11.4 points (61.5-50.1, $p<0.001$), Pain Intensity by 9.5 points (50.0-40.5, $p<0.001$), Global Physical Health by 9.2 points (44.9-54.1, $p<0.001$), and Global Mental Health by 2.5 points (50.8-53.3, $p=0.02$. Pre and postoperative physical activity participation is listed in Table 1. The most common activities reported pre and postoperatively were walking, swimming, biking, machine exercise, weightlifting, and yoga/pilates. Patient return timeline results are displayed in Figure 1. Compared to preoperatively, 16.7% (45/270) of physical activities were rated as more difficult postoperatively, 33.3% (90/270) of activities were rated as the same difficulty, and 50% (135/270) of activities were rated as less difficult. No association was found between activity impact level and preoperative to postoperative difficulty changes ($P=0.12$). Overall patient weekly activity levels are shown in Figure 2. No associations were found between changes in PROMIS domains and sessions per week, session duration, or total time spent participating in physical activities per week. PROMIS domain changes were not associated with pre to postoperative difficulty changes, but improvements in Physical Function ($P=.021$), Pain Interference ($P=.001$), and Global Physical Health ($P=.001$) were associated with increased satisfaction. No differences were detected in PROMIS scores between patients who had and had not received any of the procedures analyzed. None of the linear regressions indicated significant associations between the four most commonly performed procedures and any dimension of returns to activity.

DISCUSSION AND CONCLUSION:

This is the largest and most comprehensive analysis of patient participation in sports and physical activities following flatfoot reconstruction. Our results suggest that flatfoot reconstruction surgery generally results in good returns to physical activity. Patients were able to return to a wide range of sports and physical activities, usually within a year, and most reached their maximum preoperative levels of activity. Many patients were able to initiate new sports and physical activities, and overall, more than 90% of patients surveyed reported satisfaction with their outcomes with respect to return to physical activity. Some patients reported increased difficulty or inability to return to their preoperative maximum level of participation, indicating that flatfoot reconstructions can lead to some athletic limitations.



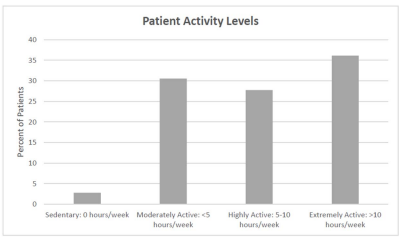


Table 1. Preoperative and Postoperative Sports and Physical Activities

Impact Level	Activity	Preop. Number of Participants (%)	Postop. Number of Participants (%)	Preop. to Postop. Change
Low	Walking	62 (86)	67 (93)	+5
Low	Swimming	32 (44)	40 (56)	+8
Low	Biking	32 (44)	37 (51)	+5
Low	Machine Cardio	30 (42)	32 (44)	+2
Low	Yoga/Pilates	26 (36)	31 (35)	+5
High	Weightlifting	26 (36)	31 (35)	+5
High	Dancing/Aerobics	22 (31)	25 (35)	+3
High	Running	15 (21)	19 (26)	+4
Low	Golf	11 (15)	13 (18)	+2
High	Tennis	9 (13)	10 (14)	+1
High	Basketball	5 (7)	5 (7)	0
High	Hockey	2 (3)	2 (3)	0
High	Interval Training	2 (3)	2 (3)	0
Low	Horseback Riding	2 (3)	2 (3)	0
High	Soccer	1 (1)	1 (1)	0
High	Squash	1 (1)	1 (1)	0
High	Skiing	1 (1)	1 (1)	0
Low	Motorcycling	1 (1)	1 (1)	0
Low	Kayaking	1 (1)	1 (1)	0
Low	Hiking	1 (1)	1 (1)	0
High	Boxing	1 (1)	1 (1)	0
Total	21	283	323	+40