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Impact of a 3-weeks specific sport rehabilitation cycle on neuromotor control in professional soccer players with lower limb injuries before return-to-play.

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INTRODUCTION:

During the last decade, professional soccer players (PSP) have been exposed to increased amount of stress on their musculoskeletal apparatus due to the greater volume and intensity of football demands¹. Despite prevention strategies, the frequency and severity of injuries hasn't decreased². As such, evaluating progression during rehabilitation and return-to-play (RTP) programmes³ and specifically neuromotor control is crucial in limiting the risks of re-injury⁴. This study aimed to investigate the effect of a 3-week specific sport rehabilitation (SSR) program on neuromotor control PSP with lower limb injuries.

METHODS:

Altogether, 15-male PSP suffering from various unilateral lower limb injuries (chondropathy, muscle lesions, anterior crucial ligament rupture) and 22 uninjured PSP (UPSP) participated. All performed 3 unilateral countermovement jumps (CMJ) with each leg ; before and after a SSR program³ for injured participants and during a single session for healthy participants. Movement analyses included whole-body kinematics, kinetics and lower limb muscle activation. Main variables were: peaks of trunk flexion and lateroflexion, knee flexion, peak and mean of %maximal voluntary contraction of studied muscles, rate of force development (RFD), peak of vertical ground reaction force , reactive strength index modified, jump height and movement time. A limb symmetry index (LSI, % difference between injured and non-injured leg) and a deficit limb index (DLI, % difference between injured leg and dominant leg of healthy participants) were computed for each variable.

RESULTS:

All CMJ variables significantly improved following the SSR program ($p < 0.05$). Improvements ranged between +7% (RFD) and +26% (jump height). LSI applied to each CMJ variable almost reached 100% after SSR, indicating a quasi-equivalent performance level between healthy and injured leg. Despite the improvement, CMJ variables except eccentric and early concentric RFD were lower in injured PSP than in healthy participants ($p < 0.05$ to $p < 0.001$). DI applied to each CMJ variable showed that CMJ performance remained lower in injured than in healthy participants.

CONCLUSION:

The neuromotor control of injured PSP significantly improved following 3-week SSR program. However when CMJ variables were compared post SSR program to normative values in UPSP, it appeared that recovery was incomplete. These results suggest that a longer SSR program is necessary to ensure safe RTP, and that DLI seems to be more relevant than LSI for decision-making during RTP programs.

1) Bradley et al., Journal of Sports Sciences, 2016.

2) Ekstrand et al., British Journal of Sports Medicine, 2021.

3) Taberner et al., BMJ Open Sport & Exercise Medecine, 2020.

4) Gokeler et al., Arthroscopy, Sports Medicine, and Rehabilitation, 2022.

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