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Return to running following knee osteochondral repair using an anti-gravity treadmill

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INTRODUCTION

Anti-gravity treadmills are being increasingly used after knee surgery to reduce ground reaction forces during walking and running.[1,2]

Antigravity treadmills have been shown to be safe and feasible to use in early rehabilitation following total knee replacement.[1] However, there are no studies on the use of antigravity treadmills in a knee osteochondral population despite their increasing inclusion in rehabilitation guidelines.

AIM

The purpose of this study was to assess the impact of an anti-gravity treadmill return to running programme on self-efficacy and subjective knee function following knee osteochondral surgery.

METHOD

Two otherwise healthy female endurance runners who had undergone knee osteochondral surgery were recruited.

Patient A - 39 year old 9 months post-Bone Marrow Aspirate Concentrate (BMAC)[3,4] for a left knee femoral cartilage grade 3-4 defect 3 cm^2.

Patient B - 54 year old 11 weeks post-surgery for a partial lateral meniscectomy and chondroplasty.

An anti-gravity treadmill (Figure 1) was used to manipulate loading during a graduated phased return to running (Table 1).

Self-efficacy was evaluated using the Self-Efficacy for Rehabilitation outcomes scale (SER)[5] and the Knee Self-Efficacy Scale (K-SES).[6] Subjective knee function was evaluated using the Knee injury and Osteoarthritis Outcome Score (KOOS).[7]

METHOD

FIGURE 1. Anti-gravity treadmill

Week	Percentage Body Weight (%)	Running Speed (km/hr)	Running Time (Mins)	Rating of Perceived Exertion (RPE)
1	30	6.7	5	7
2	30	7.2	10	7
3 Session 1	40	7.6	10	8
3 Session 2	40	7.7	15	9
4 Session 1	50	7.5	15	9.5
4 Session 2	50	8.0	20	11
5 Session 1	60	8.3	20	11.5
5 Session 2	60	8.0	25	11.5
6 Session 1	70	7.5	25	11
6 Session 2	70	7.1	30	11.5
7	80	8.0	30 mins alternating 5 mins running & 5 mins walking	11
8	80	7.5	30 mins alternating 5 mins running & 5 mins walking	10

TABLE 1. Example anti-gravity treadmill rehabilitation programme

RESULTS

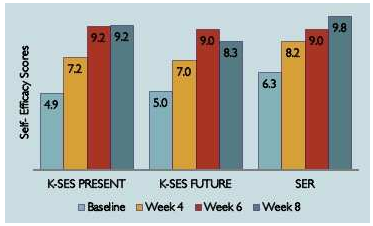

FIGURE 2a. Patient A Self-efficacy scores across the anti-gravity treadmill programme on a scale of 0-10 where a higher score indicates a greater level of self-efficacy.

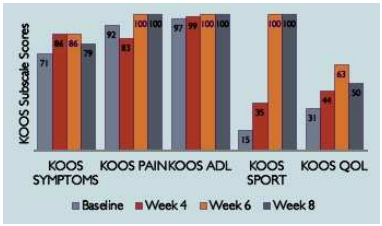

FIGURE 2b. Patient A KOOS subscale scores across the anti-gravity treadmill programme on a scale of 0-100 where a higher score indicates a greater level of function.

Summary: Patient A
- SER increased 57%
- K-SES present increased 89%
- K-SES future increased 65%
- KOOS Sport/Rec subscale showed a clinically important improvement[8]

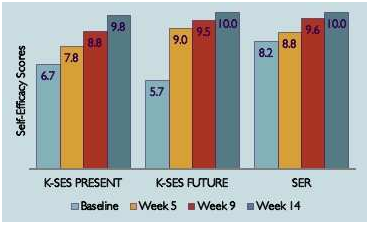

FIGURE 3a. Patient B Self-efficacy scores across the anti-gravity treadmill programme on a scale of 0-10 where a higher score indicates a greater level of self-efficacy.

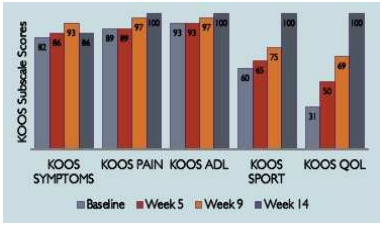

FIGURE 3b. Patient B KOOS subscale scores across the anti-gravity treadmill programme on a scale of 0-100 where a higher score indicates a greater level of function.

Summary: Patient B
- SER increased 18%
- K-SES present increased 33%
- K-SES future increased 33%
- KOOS Sport/Rec and QoL subscales showed clinically important improvements[8]

CONCLUSIONS

The programmes resulted in improved knee and rehabilitation self-efficacy and subjective knee function following osteochondral repair of the knee.

These case reports illustrate the importance of considering self-efficacy in individualising rehabilitation after knee osteochondral surgery and highlights the potential role for anti-gravity treadmills in enhancing self-efficacy and subjective knee function in preparation for a return to sport.

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