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Effect of proprioceptive training on patients with degenerative knee osteoarthritis by using the technology of three-dimensional motion analysis

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Introduction

The technology of three-dimensional (3-D) motion analysis has been widely used in the rehabilitation of degenerative osteoarthritic knee (OAK). Through the kinetic and kinematic data measured from the 3-D motion analysis in OAK patient, clinically it can help to identify the problem and to design a tailor made rehabilitation strategy accordingly. The findings from 3-D motion analysis also show significant impact on the proprioceptive training with strategy of specific alignment correction in the functional activities. Previous studies had suggested that physiotherapy program with 3-D motion analysis, proprioceptive training and strengthening exercise was found able to lower the peak adduction moment of knee joint hence significantly decrease the compressive force over the medial knee and delay the progression of disease. The current investigation will compare the effects of using 3-D motion analysis by using proprioceptive training and alignment correction with conventional treatment.

Objectives

To evaluate and compare the effects on pain reduction, physical functions improvement and satisfaction for patients receiving proprioceptive training and conventional OAK class

Methodology

Inclusion criteria included patients referred to physiotherapy department of Prince of Wales Hospital with diagnosis of OAK, pain over the tibiofemoral joint with severity over the last 24 weeks ≥ 3 on a numerical pain rating scale (NPRS), age ≥ 50 , able to read Chinese and understand Cantonese. Exclusion criteria included knee surgery, intra-articular corticosteroid injection within 6 months, cardiopulmonary instability or cognitive impairment. Patients who were willing to attend 6 identical sessions of supervised physiotherapy knee class (SPKC) which included knee care, stretching & strengthening exercise, and home program were allocated either to attend 6 sessions of SPKC finished within 8 weeks (Conventional Group); or to attend additional 4 sessions of proprioceptive training after completed SPKC within 12 weeks

(Proprioceptive Group). The outcomes were knee pain (NPRS), satisfaction with numerical global rating scale (NGRS), functional ability with Oxford knee questionnaire (OKS).

Result

40 cases studied, with 2 patients defaulted, baseline characteristics of both groups were comparable. There was a significant improvement in Peak of knee adduction moment ($P=0.008$), OKS ($P=0.02$), NGRS ($P=0.0001$) by Paired T-Test showed in Proprioceptive Group. Pain also showed improvement in pain from 4.4 to 2.05 in NPRS though P-value was not statistically significant ($P=0.07$). For the conventional group did not show any significant change statistically except pain scale changed from 3.1 to 2.05 with P-value =0.0028. In conclusion, Current findings show that proprioceptive training is useful in OAK rehabilitation with a greater satisfaction, more clinical improvement in knee adduction moment and functional outcome than conventional knee exercise class.