



Title	Effectiveness of the video-based home exercise on clinical and radiographic outcomes for subjects with osteoarthritis of the knee [an abstract of dissertation and a summary of dissertation review]
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学位論文内容の要旨
(Summary of dissertation)

博士の専攻分野の名称 博士 (医学)
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氏名 黄于庭
(Name of recipient: Yu-Ting, Huang)

学位論文題名
(Title of dissertation)

Effectiveness of the video-based home exercise on clinical and radiographic outcomes for subjects with osteoarthritis of the knee.

(変形性膝関節症症例に対するビデオプログラムを用いたホームエクササイズの臨床的およびX線学的効果の検討)

【Background and Objectives】 Osteoarthritis (OA) of the knee is a disease that limits a patient's activities of daily living ADL and affects health-related quality of life (QOL). Previous randomized controlled studies and systematic reviews conclude that exercise therapy has beneficial effects on symptoms physical function and health status of the population with knee OA. However, these effects declined over time and finally disappear. There is a possibility that the use of a home exercise video could enhance adherence to prescribed exercise program. The objective of the present study was to test the hypothesis that video-based home exercise could enhance adherence exercise and improvement in pain, physical function and QOL in patients with knee OA, and also prevent radiographic progression of knee OA compared with conventional home exercise without video media.

【Methods】 A total of 107 subjects with radiographic evidence of OA were randomized to a video-based exercise group and control group. The study was approved by the medical ethics committee of Hokkaido University School of Medicine. Subjects in the video-based exercise group received an exercise video and used it during home exercise. Subjects in the control group initially received detailed instruction of a quadriceps exercise. To evaluate adherence to home exercise, we collected the number of days when the subject performed the allocated prescribed home exercise from the custom-designed diary. The pain was assessed with the Western Ontario and McMaster Universities Arthritis Index (WOMAC), the QOL was assessed with SF-8, obesity was assessed with body mass index (BMI), and radiological evaluation of OA progression using fully automatic program. Subjects in both groups were evaluated after 6, 12 and 24 months.

【Results】 Concerning adherence to home exercise, the numbers of exercise times in a week in the video-based exercise group were 5.1 ± 2.0 , 4.0 ± 2.3 and 3.6 ± 2.4 times at 6-, 12- and 24-month, respectively. The frequency of the exercise was significantly higher than those in the control group at 6-month follow-up. The improvements in pain, stiffness and physical function categories of WOMAC were significantly

greater in the video-based exercise group than in the control group at all time periods. Physical component summary score of SF-8 was greater at 6- and 12-month in the video-based exercise group than control group, while there was no significant difference at 24-month. Concerning BMI, there was no significant difference in the reduction between the video-based exercise and control groups. Regarding radiographic OA progression, video-based exercise group showed significant increase in FTA at 12- and 24-month compared with the baseline, while we could not find significant progression in other parameters.

【Discussion】The present study was conducted to test the hypothesis that video-based home exercise could enhance adherence to prescribed exercise program, produce substantial improvements in pain, physical function and QOL in patients with knee OA, and also prevent radiographic progression of knee OA compared with conventional home exercise without video media. The numbers of home exercises in a week in the video-based exercise group were significantly greater than those in the control group at 6-month follow-up period. Concerning pain and physical function, the present study showed improvements in WOMAC scores from the baseline were significantly greater in the video-based exercise group than in the control group until 24-month follow-up. In addition, the improvement of SF-8 physical component summary score from the baseline was significantly greater in the video-based exercise group than in the control group at 6-month and 12-month follow-up. However, we also found that video-based home exercise did not enhance adherence to prescribed exercise program after 12-month compared with home exercise without video media or prevent radiographic progression of FTA of the knee for 24-month. Therefore, the findings of the present study suggested that video-based home exercise can enhance adherence to prescribed exercise program and can produce substantial improvements in pain, physical function and QOL in patients with knee OA, although our video-based home exercise cannot prevent radiographic progression of the knee OA. In the present study, our prescribed exercise took approximate 30 minutes and 7-8 minutes in the video-based exercise and the control groups, respectively. Considering the time required for the prescribed exercise, DVD media can improve adherence to prescribed exercise for a long period. In the present study, radiographic progression on JSA, mJSW, osteophyte area, and FTA has been assessed using a fully automatic program. Our method can provide an objective, accurate, simple and easy evaluation of the radiographic knee osteoarthritis severity. We detected a significant decrease of FTA in the video-based group at two years, while we could not detect another parameter. Also, no statistical differences were found in radiographic osteoarthritis progression between two groups. These findings suggest that our video-based home exercise cannot prevent radiographic progression of the knee osteoarthritis. There are limitations in the present study. First, we did not blind the subjects to the treatment allocation, and participants were aware of whether they were part of the treatment or control group. Second, a number of participants refused their allocation in the control group.

【Conclusion】 The present two-year comparative study showed that video-based home exercise can enhance adherence to prescribed exercise program for 6 months and can produce substantial improvements in pain, physical function and QOL in patients with knee OA at two years, but not to prevent radiographic progression of the knee OA.