ROYAL DEVON AND EXETER HEALTHCARE NHS TRUST

Feasibility Study into the Impact of the Unicam Pro 3 Cycling Device on Knee Joints with Limitation of Flexion

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Background:
This preliminary study has been conducted over the period - January - June 1999. It is not intended that it represents research in this area, rather it should be viewed as an exercise in testing the compliance of the device with regard to the patient and the therapist. In addition there has been some attempt to measure the impact of the device on a single case study.

For the purposes of the study the device has been on loan from the manufacturer, **Mr Paul Butterworth.** Principal Unicam Rehabilitation Products.

An initial literature search of Medline and Cinahi failed to detect any studies which directly considered the effect of this type of device.

Case #1
40 year old male underwent derotation osteotomy, secondary to trauma, January 1999. Unicam Pro 3 device was used in conjunction with other manual treatment to gain knee motion at a time when cycling a 'normal bicycle' would have been desirable, but impossible due to lack of flexion We were able to begin the treatment in the partial weight hearing phase, immediately following surgery. After five weeks there was a gain in flexion of 90 degrees, enabling normal crank lengths to be used Treatment had taken place twice per week.
Perhaps the best method of assessing the value of the Unicam Pro 3 device is to read the patients own evaluation (enclosed).

Case #2
22 year old female with active sports background. Recent surgery - Elmslie Trilliat - for recurrent dislocation of patella Surgery was followed by six weeks POP immobilisation Progression through to 140 degrees from initial flexion measured at 20 degrees took four weeks, with treatment sessions three times per week The patients personal comments regarding her treatment using the device are enclosed.

Case #3
56 year old male who underwent second stage Total Knee Replacement at the beginning of February. He has a long orthopaedic history, beginning with bilateral complex lower limb fractures twenty years ago. Recent history includes primary TKR 1995 with postoperative complications and limited knee flexion, 0-35 degrees for the past four years. Since the first stage of revision (August 1998) there has been no movement available at the knee. Maximum flexion available in theatre following second stage TKR was 35 degrees. Functional problems included locomotion, sitting position and stairs. Limitation to movement was thought to be a function of long-standing trauma to the extensor mechanism and subsequent quadricepsplasty.

Treatment throughout the postoperative period has been administered using the Unicam Pro 3 cycling device only. Treatment sessions have averaged twice per week for 15 weeks. Initial expectations were quickly exceeded, hence the unusually lengthy course of treatment. Each treatment session consisted of 30 minutes cycling.

Initial range of movement at 2 weeks post operatively was recorded as 0 - 25 degrees. Progression of range of movement against time is almost linear. At 12 weeks post operatively ROM was recorded at 0-90 degrees. In addition the patient has gained increased muscle power, improvements in contra lateral limb function and improved cardiovascular function.

In Communications with the patients surgeon the possibility of adversely affecting the prosthesis was discounted. This was based on the limited load applied through cycling, along with the total number of repetitions performed accounting for a small fraction of total daily function.

Clearly this result may be regarded as unusual, however this clinician was involved after the primary TKR and I feel without the benefit of the Unicam Pro 3 progress in knee flexion beyond 35 degrees was unlikely.

In my opinion the benefits of allowing active, rhythmical, co-ordinated, pain free and patient controlled mobility using this device to improve knee movement outweigh the use of traditional manual treatment alone. This is supported by the patients own testimonies.