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Development and evaluation of a health swing

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Objective

A Health Swing has been developed as an enjoyable and motivational form of exercise to be used by adults for specialist rehabilitation applications or general fitness and leisure.

The swing has been designed to provide exercise for the whole body with the swing motion being relaxing and stress relieving to its users. A novel feature of the swing is that users are able to adjust the resistance of the swing motion so that it can be varied to suit their specific needs providing gentle or more vigorous exercise as required.

Parameters which may be of interest from a physical rehabilitation perspective are investigated by undertaking a biomechanical analysis of the swing which includes

- A theoretical model of swing movement
- Qualitative analysis of swing movement using slow motion video
- Quantification of important parameters.

Results

Active swinging requires movement of the lower limbs and/or extension and flexion of the joints of upper body in time with the swing cycle.

Swing height under low pivot resistance can be maintained by swinging of the legs only.
Rapid climbing or swinging under moderate/high resistance requires movement of the upper body in synchronisation with the swing cycle. By varying the tension at the pivot the effort required by the user can be tailored to the users' specific needs.

In general the users' trunk, head and neck are extended at both forward and rearward extremities of the swing cycle. The hip is maximally flexed at the start of the back cycle and is maximally extended at the start of the forward cycle, with the range of hip angle increasing with the increasing resistance

The flexors and extensors of the hip and trunk are very significantly employed during high loading providing a work out for the body core muscles. The upper arms are flexed and adducted at the end of the forward cycle and are extended at the end of the back cycle. The shoulder is retracted at the end of the forward cycle and is protracted through the back cycle.

The degree of movement and loading required of the upper limb musculature (shoulder, elbow, wrists) is also proportional to the swing resistance. Climbing or swinging under resistance therefore also provides a workout for the upper limbs and shoulder complex.

Conclusions

The qualitative and quantitative analysis of this study supports the hypothesis about the potential therapeutic and fitness benefits of a health swing. It has the potential to provide an enjoyable form of exercise for the whole body. The degree of exercise workout can be controlled as appropriate for either rehabilitation, or fitness and leisure applications.

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