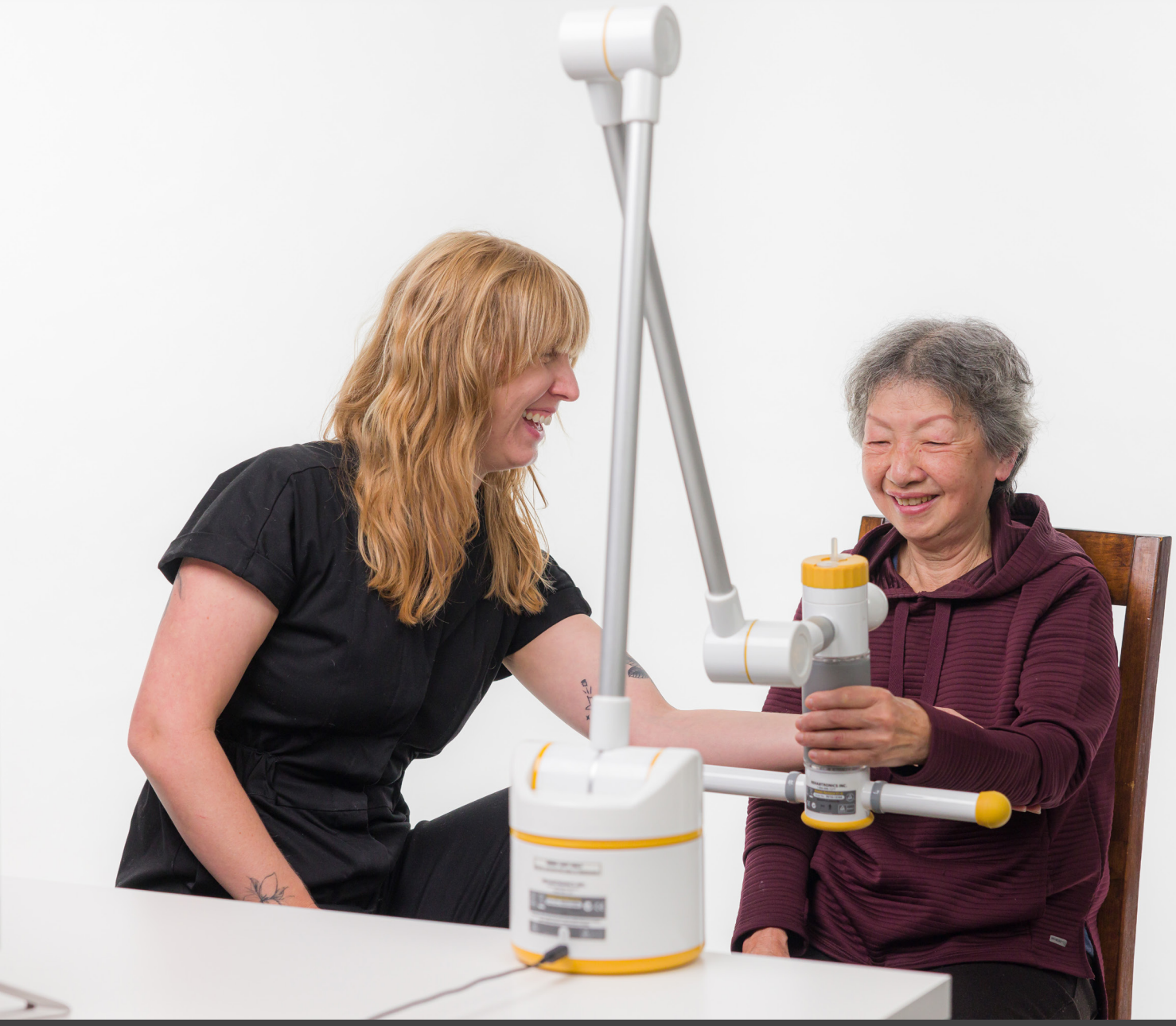
REHABTRONICS
TECHNOLOGY FOR RECOVERY

ReJoyce

ReJoyce Workstation Best Practices



September, 2024

For use with the ReJoyceX software platform versions 1.9 and prior

**Except where indicated, where only upgraded ReHab software version 2.1.3 is applicable*

1. Disclaimer

The clinical treatment protocols described here are designed to guide best practice by providing information that will assist in clinical decision-making. It is important to realize that the guidelines cannot always account for individual variation among patients and are not intended to replace clinicians' judgment in specific patient cases or unique clinical situations. These guidelines should not be viewed as encompassing all proper methods of care nor excluding other treatments that may also achieve the desired outcome. The ReJoyce is intended to be used under clinician supervision only. For more information on how ReJoyce operates, please refer to the ReJoyce manual.

2. Introduction

The ReJoyce is a rehabilitation device that has been shown to increase the strength of muscles and the range of motion of joints of the upper extremities. It also measures and evaluates outcomes quantitatively and therefore objectively. The ReJoyce helps patients to retrain and condition their neuromuscular system by using their hands and arms to play interactive computer games. The activities involved in these games are similar to dexterous tasks of daily life, such as grasping and transferring objects, pouring drinks or opening jars. Practicing these tasks helps patients to perform them in real life.

This document is a guide for using the ReJoyce rehabilitation workstation to assist in maximizing your clients' recovery of upper extremity motor function following stroke, spinal cord injury, and other injuries to the central nervous system. The protocols described were developed during clinical trials involving people with spinal cord injury and stroke.

This document assumes the reader has some familiarity with the ReJoyce workstation, the ReJoyce Hand and Arm Function Test (RAHFT) and ReJoyce exercise games. The RAHFT is an automated, quantitative hand and arm function test that takes 5-15 minutes to complete.

**ReHab software users should also be familiar with the testing feature, including default and customizable tests (refer to section 3.3).*

3. Getting Started

3.1 Initial Client Assessment

Without Functional Electrical Stimulation (FES) assistance, ReJoyce works best with clients who have at least some voluntary arm function. In people with proximal arm function but little voluntary control of hand grasp and release, clinicians have used a strap or Thera-Band® to secure the hand to ReJoyce attachments, allowing range-of-motion exercises.

Clients with no voluntary hand or arm function will likely not benefit from treatment with the ReJoyce until they have recovered at least some functional movement.

3.2 ReJoyce Exercises

During the first few sessions, clinicians should familiarize their clients with the way the ReJoyce works, and the various exercise games. By performing a RAHFT test, a baseline performance record can be established, and the client can familiarize themselves with the various functionalities of the ReJoyce device. Once a client completes the RAHFT, the system automatically recommends the game difficulty depending on their performance (**Feature not available for ReHab users*). Completion of the RAHFT test should take approximately 5 – 15 minutes. Regarding gameplay, clinicians should feel free to choose the control mechanism(s), the games to be played, and their difficulty levels, according to the client's abilities.

Whether the RAHFT has been used to identify a client's level of functional impairment or not, it typically becomes quickly apparent as to which games will best suit a client's needs. In cases of clients with minimal hand function, games requiring only gross arm movements should be selected. Conversely, games involving dexterous movements should be used with higher functioning patients.

3.3 Performance Monitoring

The ReJoyce can be also used as a performance monitoring system. To establish a baseline performance record, clients should complete the RAHFT before starting treatment with ReJoyce.

If performance monitoring is planned, it is important to create a specific user profile and to perform regular RAHFT assessments to keep their profile updated and their progress logged. Data from each component of the RAHFT are stored within the selected profile and can be reviewed over time to monitor patient improvement.

**In addition to the RAHFT, ReHab software users can have their clients perform other default or custom tests. The available default tests are:*

1. **ReJoyce Automated Hand Function Test (RAHFT)**
   This includes all sub-tests, utilizing all functions of the ReJoyce.
2. **Arm Range of Motion Test (AROMT)**
   This includes a subset of tests in the RAHFT to test only gross motor movements of the arm.
3. **Hand Function Test (HFT)**
   This includes a subset of tests in the RAHFT to test only fine motor movements of the hand.

Custom tests of only preferred ReJoyce sub-tests can be created and made to display to only specific clients or to all clients.

In situations where tracking patient performance is not required, the ReJoyce may be used on a casual basis by selecting the Quickstart menu option.

**ReHab software users can select the Quickplay option on the login screen.*

3.4 Motivation and Exercise

Motivation plays a crucial role in all rehabilitation and ReJoyce training is no different. Games on the ReJoyce are designed to assist the clinician motivate their clients to perform otherwise repetitive tasks. It is not uncommon that clients will exert themselves significantly more when using the ReJoyce than in traditional rehabilitation. It is important to be aware of a client's level of exertion and to pause games when they show signs of fatigue or overuse. Generally, the less functional clients are, the shorter and more frequent their ReJoyce treatment sessions should be.

4. ReJoyce Protocol According to RAHFT Score

4.1 RAHFT Score: 0-20 (clients with virtually no proximal range of motion and minimal distal function)

We encourage use of the affected limb by starting with forward and backward reaching games as well as left-right movement games with the hand positioned on one of the handles. The goal is to progress to games involving the gripper. Suitable games include Boxing, FreeRacer, Catcher, and Tennis.

In clients with poor arm function, the use of the less affected hand to support and properly position the more affected hand is appropriate. Recent clinical and scientific evidence indicates that bimanual exercise, for example grasping both handles of the ReJoyce to play games, is beneficial, but forced-use of the more affected limb, as practiced in constraint-induced movement therapy, is preferred by some clinicians.

4.2 RAHFT Score: 15-40 (clients with moderate proximal range of motion and minimal distal function due to spasticity)

In this case, overcoming flexor spasticity is the primary goal. Games such as Bullseye and Cupid's Arrow, involving the gripper, are designed to encourage the user to relax and release grasp after each squeeze. No special emphasis should be put on training proximal range of motion as the games naturally lead the client to perform these movements as part of gameplay.

4.3 RAHFT Score: 30-65 (clients with dexterous impairment but with reasonable proximal function)

If the client is within this range, use games that require the individual to make numerous grasps and releases in a short period of time (Stack Attack, Bullseye). For patients with lower functional level, it may be helpful to allow the less affected hand to assist with the tasks presented (unless the methods of constraint-induced movement therapy are preferred). These games can be quite tiring, without the client always realizing it, so appropriate rest breaks are suggested. Focus can also be on games that combine range of motion with dexterity. Using any range of motion game that requires little dexterity (Tennis, Boxing, FreeRacer) is appropriate when the client starts to fade from the more challenging games.

4.4 RAHFT Score: 40-65 (clients with reasonable distal function but limited proximal function)

In this case, clients benefit mostly from tasks designed to increase their range of motion. Games that combine range of motion with a dexterous task are best (Weedo, SpacePort, Blox). Shooting games (Bullseye, Cupid's Arrow) also work well for these patients.

It is not uncommon that clients will become fatigued quickly when playing games requiring a large range of motion. If this occurs, range of motion games can be substituted for games requiring dexterous tasks only, such as Stack Attack and FreeRacer.

4.5 RAHFT Score: 65+ (clients with mild impairments)

Typically, high-functioning clients benefit most from dexterous tasks involving the ReJoyce key, doorknob, peg, and coins while performing large movements of the proximal arm segments. High-functioning individuals will benefit most from games that challenge them, especially games that gradually increase speed, like Stack Attack. Games that require more complex movement patterns, like Bartender, are also effective.

**Bartender no longer exists for ReHab software users. Instead, play Wizard.*

5. Specific Conditions and Enhancements

5.1 Chronic Stroke Clients (more than 1-year post-stroke)

In all chronic stroke clients stretching of the arm and hand should be encouraged.

5.2 Sub-acute Stroke Clients (less than 1-year post-stroke)

Typically, spasticity is less pronounced in this patient group, and in many cases the more affected arm is quite flaccid. These individuals may also be much less fatigue-resistant and will require shorter sessions with ReJoyce. Individuals in the sub-acute stage of recovery tend to exert themselves and concentrate hard during game play, so they should be monitored and reminded to breathe regularly, as in some cases their rate of respiration drops.

5.3 Using an FES Stimulator with the ReJoyce

Using an FES stimulator in combination with ReJoyce can speed up recovery. In stroke clients, stimulation should focus on finger and thumb extensors to augment hand opening. It is worth noting that timing is important; extensors should be stimulated to open the hand, and this should cease when the client intends to grasp. Stimulation devices that do not impair a functional grasp should be used. Be cautious as some stimulators can obstruct the palm of the hand to the extent that they are unsuitable for practicing activities of daily life with the ReJoyce.

5.4 Using a Sling for Arm Support

The use of an overhead arm-support system can facilitate ReJoyce gameplay for low functioning patients during the sub-acute phase of stroke recovery. Care should be taken to make sure that the hand is not obstructed by the sling. Furthermore, clinical judgement is required, as in some cases adjusting these support devices can take up a good portion of the treatment session.

5.5 Clients with Impaired Cognitive Function

Clients with impaired cognitive function should initially avoid the more complex games even if their hand function permits them. This will avoid confusion, frustration, and a drop in compliance. As their familiarity with the gameplay grows, these clients may slowly progress to the more cognitively demanding games.