C4 Quadriplegic Case Study

Michael is a 39 year old male with a diagnosis of C4 quadriplegia, onset 12/20/04, which occurred when he was struck on the back. His initial symptoms included mid back pain with quickly progressing right foot numbness, then loss of sensation to both legs up to the chest level. M. underwent cervical decompression and fusion.

M. was evaluated for PT and OT on 2/14/05. He wore a cervical collar and was wheelchair bound. M. was incontinent of bowel and bladder. His right arm strength was in the 4+ grade grossly. Left arm strength was 2- for shoulder muscles, 1 for biceps and supinator. Right leg ranged from 0 to 2- grossly. The left leg ranged from 2- to 3- grossly. He was dependent for bathing, house keeping and getting in and out of his house.

Interactive Metronome was initiated 4/26/05, when his arms and legs were strong enough to support his weight using a walker or loftrand crutches. He was able to walk with the crutches 180 ft. in 9 min. 40 sec with minimal assistance using a 4 point gait pattern. He performed transfers in and out of his wheelchair with close supervision. Interactive Metronome was modified to allow sitting when using the hands, standing with a walker, placing a wedge under the foot trigger to allow for weak dorsi-flexion and hitting the foot trigger every other beat.

Patient goal: walk unassisted.

Treatment #1
M. tolerated up to 70 repetitions of both hands, with the trigger on his dominant, less affected right hand. All lower extremity exercises were performed hitting every other beat, using a walker and heavy support of both hands when performing all leg exercises.

Treatment #2
Goal- facilitate abdominal contractions and trunk stability, increase left arm strength and supination. M. sat on physioball with light support of therapist when performing both hands. M. placed the hand trigger on the non-dominant left hand to emphasize increased left hand movement and supination. He worked on increasing endurance of legs and arms.

Treatment #3
Goal- facilitate trunk stability and dorsiflexion, and speed of legs. M. sat on physioball and performed alternating toe exercises, hitting every beat. He continued to work on endurance of hands and standing. When working on endurance high goals were set, allowing short rests as required.

Treatment #4, 5 & 6
Goal- improve standing balance without support, facilitate reciprocal patterns,

facilitate weight shifting. For hand exercises M. stood close to the table with the walker in front of him and a chair behind him in case of loss of balance. He performed both toe exercises, raising the opposite arm simultaneously to touch a box on the table to simulate reciprocal walking and arm swing. Two hand triggers were used, placing each on a box on either side of the IM computer. M. hit the triggers, crossing midline to facilitate trunk rotation and stability when standing.

Treatment #7
Goal- facilitate weight shifting, and narrowing base of support. M. performed both toes, crossing midline, hitting the foot triggers on either side of him.

Treatment #8
Goal- improve weight shifting, prepare pt. for axillary crutches, and facilitate heel strike. The foot triggers were placed on both sides of M. He hit alternating foot triggers, facilitating hip abduction and performed simultaneous toes and opposite hands to boxes placed on table to simulate walking with an arm swing. The foot trigger was placed in front of M. He hit alternating heels, instead of toes to simulate heel strike.

Treatment #9
Goal- improve trunk stability and balance, increase left arm supination, and general strength and endurance. Until this time, M. depended on a walker for support during foot exercises. A PVC pipe was substituted to increase demand for trunk stability. A one pound weight was placed on the left wrist during bilateral hand exercises. M. attempted to use a body blade with his right arm, while performing left toe taps to the foot trigger for a short duration to challenge his timing.

Treatment #10, 11 & 12
Goal - improve balance standing on feet and facilitate weight shifting back and forth and laterally. Foot triggers were placed in front of and behind M. He alternated hitting right foot forward, left foot behind, then switched feet, using axillary crutches for support. M. continued to work on leg exercises, stabilizing himself with a PVC pipe only. M. straddled one foot trigger, placed between his legs. He hit alternating toes, using crutches for support. Using two hand triggers, on either side of the computer table, M. stood unsupported for the first time. He hit alternating triggers with the opposite hand, crossing midline and shifting his weight.

Treatment #13
Goal- improve balance and lower extremity strategies for appropriate responses to quick stimuli. M. held two PVC pipes (one in each hand) for stability. Two foot triggers were used, one with a green dycem pad placed on it, the other with a blue pad. The therapist stood behind the computer, holding up either a green or blue paddle. The patient tapped the corresponding foot trigger.

M. was discharged to independent living, without ramp to his home or other assistive devices except small based quad cane on 5/27/05 after 14 IM sessions.

At discharge he was independent with all self care activities including showering and dressing, all wheelchair transfers, meal preparation, laundry, dishes, and house cleaning. He is independent getting in and out of his home which requires 3 steps to enter with bilateral hand rails.

He walked without any assistive device 180 feet with contact guard assist and occasional minimal assist for balance in 7 min.

Michael stopped in to say "hi" on 8/18/05. He was walking with a near normal gait without an assistive device.