was shown between the two groups for gait velocity, step length, step width, or simple support time.

Conclusion.– It seems that quantified gait parameters are not relevant evaluation criteria to assess the efficiency of a treatment with botulinum toxin type A. This evaluation must be done using satisfaction scales fulfilled by the patient, linked with therapeutic objectives that are well specified before the treatment, with the PRM doctor.


CO22-001–EN
Neurophysiological features of motor imagery with applications in motor rehabilitation
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Keywords: Motor imagery; Quadiplegia; Grasping; Motor rehabilitation; Tenodesis

Introduction.– Motor imagery is the mental representation of a movement without any concomitant execution. One of the main features of motor imagery is to share the same properties with actual execution, in particular, the principle of isochrony. Therefore, the aim of this presentation is to describe how motor imagery can be incorporated into the rehabilitation process of patients with tetraplegia. For over 10 years, the literature describes significant advances in the rehabilitation of motor functions through motor imagery, whether concerning central (brain, spinal cord) or peripheral lesions.

Comments.– We focus on grasping illustrated by two clinical cases where motor imagery was integrated into conventional physiotherapy and occupational therapy management. The first patient had a level C6-C7 lesion and was able to re-learn to grasp objects with the tenodesis effect. The motor imagery work was mainly focused on motor function of daily life. We showed an improvement in movement time, precision and range of motion. The second patient exhibited a C5-C6 spinal cord lesion, leading to the impossibility of arm extension. After surgery, i.e. the transfer of the distal insertion of the biceps tendon on the triceps, the rehabilitation of the extension of the forearm on the arm and the seizure of an object by tenodesis effect was undertaken with a protocol comparable to the first patient. We observed an improvement in kinematic parameters with decreased movement times and reduced variability of arm trajectory. Progress remained stable during a retention test at 1 month.

Discussion.– The role of motor imagery is beneficial in addition to conventional rehabilitation. It strengthens motor programs through brain plasticity and also helps to learn new ones. Physical workload could thus be reduced, especially when eliciting fatigue and pain. The quality of the imagery work remains to be evaluated. A set of tests is used to evaluate the vividness of the mental image, the maintenance of attention during the work session and a level of physiological arousal consistent with a sustained mental work. We currently work on a larger maintenance of attention during the work session and a level of physiological arousal consistent with a sustained mental work.

References


CO22-003–EN
Isokinetic program in stroke survivors with chronic upper limb hemiparesis
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Keywords: Stroke; Chronic hemiparesis; Isokinetic muscular strengthening; Upper limb

Purpose.– To evaluate the effects of isokinetic strength training combined with conventional rehabilitation on hemiparetic arm motor function in patients with chronic stroke.

Patients and methods.– Eight patients with persistent hemiparesis 6 months after stroke were included in a 6 weeks rehabilitation program. Rehabilitation sessions occurred 3 times a week during 6 weeks. The program involved isokinetic muscle strengthening in CPM mode of flexor and extensor muscles of the elbow and wrist, associated with a conventional neurological rehabilitation of the affected upper limb. The evaluation was made before and just after the program (18 sessions) bearing on 3 points: clinical evaluation, isokinetic test and functional evaluation (Fugl-Meyer upper limb scale [FMS] and Block and Box test [BBT]).

Results.– At the beginning of the study, the isokinetic evaluation highlighted a speed-dependent muscular deficit on the muscular groups tested. After 18 rehabilitation sessions we noted a significant increase in FMS upper limb scale (+18%, P < 0.01) and in BBT score, an increase in muscle strength without any increase in upper arm spasticity.

Discussion.– The loss of strength is considered as a major limiting contributor to disability after stroke (Canning, 2004). Some studies present arguments in favour of an isokinetic training of the paretic upper limb, by highlighting deteriorations of the characteristics of the muscular contraction. It is expected that isokinetic training could improve both magnitude and time-dependent
properties of muscular contractions in chronic stroke patients. Further investigations are needed to confirm the interest of this kind of muscle strengthening in the upper limb motor recovery following stroke.

Further reading

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Keywords: Score; Walking; Dynamic stability; Spatiotemporal parameters

Spatiotemporal parameters (STP), simple to obtain nowadays, are the quantifiable parameters the most used to evaluate walking in a global way and to assess fall risk. Two characteristics of balance—inspired by terminology used in posturology for study of static balance [1]—must be taken into account during walking: steadiness and stability. Steadiness will be all the STP modifications which tend to minimize imbalance and to facilitate the control. Stability is the faculty to reply efficiently to internal or external disturbances when walking. While a conglomerate score, the Functional Ambulation Performance Score [2,3], allows a quick view of the steadiness feature, there is nothing concerning the dynamic stability. We propose a new score.

Methods.– A GAITRite walkway was used to log STP in 219 subjects. We kept nine STP to develop a new score from principal component analysis. Based on quantification of step-to-step and stride-to-stride variations of selected STP, this score assesses the walking dynamic stability.

Results.– While healthy subjects (n = 123, 35 ± 13 years, 22–62) had an average score of 100 (±7), the score decreased when the variability increased. Results for patients with Friedreich’s Ataxia (n = 95, 18 ± 4 years, 12–26), walking without aids or with walker, were also presented (67 ± 9). Reliability analysis is currently in progress but already seems good in healthy and disabled subjects.

Discussion.– Our new score characterizes walking dynamic stability from STP variability. Used with FAPS, it will allow dynamic balance to be assessed in a complete way when the patient walks.

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CO22-006–EN
Evolution of locomotive performance in HIV-infected patients in the ANRS CO3 Aquitaine Cohort

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Keywords: HIV; Locomotor function; Muscle strength; Dynapenia

In a previous cross-sectional study [1], prevalence of the poor locomotive performances (performance in more than a clinical test lower than the standards established in the literature) was considered at 29% (CI 95%: 24; 34) in 324 patients HIV of the ANRS CO3 Aquitaine cohort. The five-times sit-to-stand test was most frequently altered.

Objective.– To study the evolution of the locomotive performance 2 years later of the patients initially included in the cross-sectional phase of the CogLoCHIV study.

Method.– A longitudinal and prospective study reproducing the same battery of standardized and validated tests, investigating various domains of the locomotive function (timed up and go, 5 sit to stand test [5STS], one-leg-standing with eyes closed, six-minute-walk, Berg scale). A measure of the isotometric strength and a collection of the physical activity were also performed.

Results.– The analysis concerned the first 97 patients included in the longitudinal phase. The average performances of 5 STS (10.7 vs 9.9 initially, P = 0.005) and of the test of 6-minute-walk (511 m vs 572 m initially, P < 0.001) degraded in a significant way. The patients having degraded their time of 5STS of more than 2 second had weaker isotometric strength ofprehension than the others (36 ± 9 kg vs 43 ± 8 kg, P = 0.01). No degradation was noticed on the other hand concerning the other clinical tests.

Conclusion.– In 2 years of follow-up, the performances in two clinical tests appealing in particular to muscular power and stamina deteriorated. The possibility of a sarcopenia or dynapenia process arising in a more premature way in this population is evoked.

ddoi:10.1016/j.rehab.2011.07.572

CO22-005–EN
Evaluating walking dynamic stability: A spatiotemporal parameters based score

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Discussion.– Our new score characterizes walking dynamic stability from STP variability. Used with FAPS, it will allow dynamic balance to be assessed in a complete way when the patient walks.


CO22-004–EN
Vertical perception after stroke: Anatomy and clinical correlates for visual vertical

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Keywords: Visual vertical; Stroke; Insula

Introduction.– The insula seems to be a crucial zone in the perception of the visual vertical (VV). This has been suggested by a qualitative analysis of the cerebral lesions [1], and has never been statistically confirmed [2]. The aim of this study was to precisely analyse, with modern cerebral imaging, the cerebral area supporting VV perception.

Methods.– VV was assessed in 23 subjects with unique hemisphere stroke (52.9 ± 1 years, 3.7 ± 2 months after stroke) and 27 control subjects (54 ± 9 years). Lesion location and extension were analysed using MRI (n = 16) or CT scans (n = 7). The lesions were reconstructed onto standardized brain templates. All lesions were mapped using the free MRICro software distribution.

Results.– As expected, a spontaneous contralesional VV tilt (−4.7 ± 4.7; P < 0.001) was found in hemiplegics. VV did not differ between right and left stroke. A correlation was found between lesion extension and the magnitude of VV tilt (r = 0.54; P < 0.01): the longer the extension the more biased the visual vertical towards the contralesional side. The analysis of the cerebral lesions of patients with (n = 14) minus patients without visual vertical bias (n = 9) showed that the most frequently and specifically damaged cerebral region in patients with biased visual vertical was centered on the insula (P < 0.01).

Discussion–conclusion– The essential role of insula in perception of VV is confirmed. Nevertheless, the absence of right hemispheric dominance, and the influence of lesion extension on VV suggest that vertitility representation depends more on the competencies of neural circuits than the properties of a given brain structure, and that VV would partially test verticality representation, more specifically than deal with vestibular graviception [3].

References
[2] Yelnik AP, Lebreton FO, Bonan IV, Colle FM, Meurin FA, Guichard JP, et al. Lesions of the cerebellar vermis influence of lesion extension on VV suggest that verticality representation is confirmed. Nevertheless, the absence of right hemispheric dominance, and the influence of lesion extension on VV suggest that vertitility representation depends more on the competencies of neural circuits than the properties of a given brain structure, and that VV would partially test verticality representation, more specifically than deal with vestibular graviception [3].