CO05-002-e
Restrictive ventilatory defect of neuromuscular or neurological origin. Support for patient therapeutic education (cough school)
R. Plassat *, T. Peron
CM&P Rennes-Beaulieu, 41, avenue des Buttes-de-Coesmes, 35700 Rennes, France
*Corresponding author.
E-mail address: raphaelleplassat@fscf.net.

Keywords: Cough; Therapeutic education; Neurology; Neuromuscular diseases

Objectives.– To assess the importance of screening for cough deficiency in patients with a restrictive ventilatory defect of neuromuscular or neurological origin, seek an effective technical assistance, and train the patient and the primary caregivers to the technique used in case of dependency.

Method.– Analysis of case series as part of a preliminary study and from a standardized assessment protocol: Assessment of cough (including the human environment and equipment, spirometry with cough peak expiratory flow (cough PEF) and respiratory pressure measurements, assistance tests (testing manual and/or instrumental techniques selected as a function of the context, evaluation of their tolerance and their effectiveness with an assisted cough PEF), training if necessary of private practice physiotherapist and caregivers. Inclusion criteria: patients with a restrictive ventilatory defect of neuromuscular or neurological origin with a cough PEF less or equal to 270 L.min⁻¹ (ineffective cough threshold).

Results.– Thirty-three patients were evaluated, including 14 SCI and 6 neuromuscular diseases. The cough PEF was below 270 L.min⁻¹ in 14 cases. Thirteen received support tests and training. Since then, five patients have been using the technique taught during an episode of obstruction.

Discussion/conclusion.– This “cough school” concept is an essential evaluation and education support for patients and their families. It meets the specifications of therapeutic education programs in terms of developed skills: self-monitoring of respiratory status (signs of obstruction, hypercapnia), solicitation of primary caregivers, performing a technical gesture or supervision by caregivers, and prevention of avoidable complications. “The cough school” is part of specialized physical medicine and rehabilitation centres and requires close work with private practice therapists, who must be trained. Benefits analysis and satisfaction measurements will be the topic of a future study.

Further reading

CO05-004-e
Cross slope-induced stress for paraplegic manual wheelchair users: An EMG analysis
B. Pierret a,*, K. Desbrosses a, J.-P. Meyer b, J. Paysant c
* Institut national de recherche et de sé´curité (INRS), institut re´gional de médecine physique et de réadaptation (IRR), rue du Morvan, CS 60027, 54519 Vandœuvre-les-Nancy, France
b Institut national de recherche et de sé´curité (INRS), Vandœuvre-les-Nancy, France
c Institut régional de médecine physique et de réadaptation (IRR), Vandœuvre-les-Nancy, France
*Corresponding author.
E-mail address: benoit.pierret@yahoo.fr.

Keywords: Paraplegics; Manual wheelchair; Displacements; Cross slope; Muscles strains; Employment; Environment

Introduction.– Moving over a cross-slope is a factor of strain for manual wheelchair (MWC) users. In France, the cross-slope tilt is limited to 2% by law. However, this limit is frequently overcome and in these cases, the physiological consequences are poorly assessed.

Objective.– This study aimed to quantify, through electromyographic (EMG) recordings and analysis, the muscular strains while moving in a MWC over a cross-slope surface.

Methods.– Twenty-five male paraplegics achieved a 300-meter displacement in eight experimental conditions combining four different tilts: 0 (flat), 2 (French standard), 8 and 12%, and two speeds (comfort and imposed speed at 3.5 km/h). Sixteen muscles involved in the MWC propulsion were assessed using surface EMG quantified by their Root Mean Square values.

Results.– The first results showed a noticeable effect of cross-slope on the main muscles EMG for both intensity and right/left balance. At the highest tilts, objective signs of muscular fatigue were demonstrated by EMG changes.

Discussion/Conclusion.– The deleterious effects of cross-slope tilt on the MWC displacement strains are undeniable: muscle activity level required to oppose the cross-slope effect is high. If the slope is significant and/or if the path length on cross-slope is consistent, the occurrence of fatigue is high. Eventually, muscular stress may lead to the development of musculoskeletal disorders and pathologies.

http://dx.doi.org/10.1016/j.rehab.2012.07.426

CO05-005-e
Effect of cross-slope on cardiorespiratory stress in paraplegic manual wheelchair users
B. Pierret a,*, K. Desbrosses a, J.-P. Meyer b, J. Paysant c
a Institut national de recherche et de sécurité (INRS), institut régional de médecine physique et de réadaptation (IRR), rue du Morvan, CS 60027, 54519 Vandœuvre-les-Nancy, France
b Institut national de recherche et de sécurité (INRS), Vandœuvre-les-Nancy, France
c Institut régional de médecine physique et de réadaptation (IRR), Vandœuvre-les-Nancy, France
*Corresponding author.
E-mail address: benoit.pierret@yahoo.fr.

Keywords: Paraplegics; Manual wheelchair; Displacements; Cross slope; Cardiorespiratory strains; Employment; Environment

Introduction.– Moving in a manual wheelchair (MWC) is one of the important factors determining the non-integration or withdrawal of MWC users of working age from occupational activities. Among the difficulties of moving, cross-slope, defined as the inclination of the field perpendicular to the flow direction, is one of the most important. This constraint, which may be present on the way to work and/or at the workplace, is theoretically limited to 2% by law. The reality is quite different, causing poorly known cardiorespiratory stress.

Objective.– This study aims to quantify the cardiorespiratory stress encountered by paraplegics moving in MWC on a cross-slope.

Methods.– Twenty-five paraplegics performed a sub-maximal arm cranking test and eight tests on a track. They covered a distance of 300 m at four tilts (0, 2, 8 and 12%) and two speeds (comfort and imposed speed at 3.5 km/h).

Results.– At 3.5 km/h, the average cardiac cost during their last lap was increased 3-fold from 13 bpm at 0/2% and 28 bpm at 8% to 40 bpm at 12% cross-slope. The average oxygen consumption increased by 60% from 8 ml.kg⁻¹.min⁻¹ at 0/2% and 11 ml.kg⁻¹.min⁻¹ at 8% to 13 ml.kg⁻¹.min⁻¹ at 12%.

Discussion/Conclusion.– Cross-slope implies consequent cardiorespiratory stress and requires considerable effort which users are not always able to provide. The unsuitability of the environment amplifies the initial stress for MWC users and favours their exclusion from the work market.

http://dx.doi.org/10.1016/j.rehab.2012.07.426

CO05-005-e
Rotator cuff tears in persons with spinal cord injury: Prospective study and relevance of a multidisciplinary approach
C. Fattal a,*, A. Gelis a, H. Rouays-Mabit b, B. Coulet b, C. De Labachelerie a, J. Teissier a

Keywords: Paraplegics; Manual wheelchair; Displacements; Cross slope; Cardiorespiratory strains; Employment; Environment

Introduction.– Moving in a manual wheelchair (MWC) is one of the important factors determining the non-integration or withdrawal of MWC users of working age from occupational activities. Among the difficulties of moving, cross-slope, defined as the inclination of the field perpendicular to the flow direction, is one of the most important. This constraint, which may be present on the way to work and/or at the workplace, is theoretically limited to 2% by law. The reality is quite different, causing poorly known cardiorespiratory stress.

Objective.– This study aims to quantify the cardiorespiratory stress encountered by paraplegics moving in MWC on a cross-slope.

Methods.– Twenty-five paraplegics performed a sub-maximal arm cranking test and eight tests on a track. They covered a distance of 300 m at four tilts (0, 2, 8 and 12%) and two speeds (comfort and imposed speed at 3.5 km/h).

Results.– At 3.5 km/h, the average cardiac cost during their last lap was increased 3-fold from 13 bpm at 0/2% and 28 bpm at 8% to 40 bpm at 12% cross-slope. The average oxygen consumption increased by 60% from 8 ml.kg⁻¹.min⁻¹ at 0/2% and 11 ml.kg⁻¹.min⁻¹ at 8% to 13 ml.kg⁻¹.min⁻¹ at 12%.

Discussion/Conclusion.– Cross-slope implies consequent cardiorespiratory stress and requires considerable effort which users are not always able to provide. The unsuitability of the environment amplifies the initial stress for MWC users and favours their exclusion from the work market.

http://dx.doi.org/10.1016/j.rehab.2012.07.426
Hereditary multiple exostoses; Spinal cord compression

Keywords: albanhotep@hotmail.fr
E-mail address: *Corresponding author.
Service MPR locomotrice, hôpital Saint-Jacques, CHU de Nantes,
Observation
symptoms are unspecific like walking troubles.
complications of spinal cord compression are reported during the disease
within a 100 m area with a Zimmer.
spastic tetraplegia left predominant. For 4 years, walking has been possible
frequent one is The C2 vertebra. When following these patients it's important
irritation, MRI permits to see the extent of the lesion and decide whether to
look for myelopathy signs. In case of walking problems and spinal cord
further impairments. These tears are inevitably progressive by nature.
objective was to define the functional, lesional and clinical profiles as well as
therapeutic pathways of patients with spinal cord injury seen in medical-
surgical consultation for shoulder pain and/or shoulder-related impairments.
Materials and methods.-- Twenty-eight patients with spinal cord injury
including 23 with paraplegia, were seen in the framework of a specialized
counselation due to the importance of their painful shoulder and/or functional
improvement. Eighteen out of the 28 subjects had preventive or reconstructive
surgery on one or both shoulders. The mean delay between initial injury and
rotator cuff surgery was 28 years.
Results and discussion.-- Surgery became necessary for more than half of the
population seen in this consultation. The time to surgery was quite lengthy.
Results revealed the relevance of early screening based on a real strategy of
multidisciplinary care management. When surgery becomes necessary, an early
and as minimally invasive as possible approach would be the most adequate
solution. Preventive acromioplasty should also be discussed.
Further reading

Dyson-Hudson TA, Kirshblum SA. Shoulder pain in chronic spinal cord injury.

http://dx.doi.org/10.1016/j.rehab.2012.07.427

CO05-006-e

Spinal cord compression in hereditary multiple exostoses
A. Fouasson-Chailoux , P. Menu, M. Dauty, C. Dubois
Service MPR locomotrice, hôpital Saint-Jacques, CHU de Nantes,
85, rue Saint-Jacques, 44093 Nantes, France
*Corresponding author.
E-mail address: albanhotep@hotmail.fr.

Keywords: Hereditary multiple exostoses; Spinal cord compression
Introduction.-- Hereditary multiple exostoses is an autosomal hereditary
disorder that is characterized by the presence of exostoses. Occasional
complications of spinal cord compression are reported during the disease
evolution. It’s due to spinal exostoses. Its evolution is slow and the first
symptoms are unspecific like walking troubles.
Observation.-- A 71-year-old patient with hereditary multiple exostoses is
addressed to the department via the emergencies for increasing walking troubles
responsible for frequent falls. The clinical examination finds an AIS D upper C4
spastic tetraplegia left predominant. For 4 years, walking has been possible
within a 100 m area with a Zimmer.
MRI shows an exostose originating from the C2 right lamina with vertebral
channel development, responsible for spinal cord compression. Decision is taken
to practice surgical decompression with exostoses resection to prevent
worsening.
Discussion.-- All the bones can be concerned in case of a hereditary multiple
exostoses. Most frequent locations are on long bones mainly around knees and
forearms. Neurological complications are not the most frequent ones but are far
from being exceptional, different studies show their presence in 1 to 9% of
patients. Cervical rachis lesions represent 80% of vertebral lesions and the most
frequent one is The C2 vertebra. When following these patients it’s important
to look for myelopathy signs. In case of walking problems and spinal cord
irritation, MRI permits to see the extent of the lesion and decide whether to
operate or not.

Further reading

Roach JW, Klatt JWB, Faulkner ND. Involvement of the spine in patients with

http://dx.doi.org/10.1016/j.rehab.2012.07.428

CO05-007-e

The relationship between ambulation level and HDL values in male spinal cord injured patients
B. Erhan ,*, S. Oxn, *, B. Gunduz ,*, S. Kocer
* Istanbul PMR Training Hospital, Bakirkoy, 34000 Istanbul, Turkey
b Centre de MPR de Coubert, France
*Corresponding author.
E-mail address: echorehab@gmail.com.

Keywords: Spinal cord injury; Paraplegia; Tetraplegia; Physical activity;
HDL; Lipoproteins
Objectives.-- The risk of cardiovascular disease is high in spinal cord injury
(SPI) patients. The blood lipid profile is an important element determining the
cardiovascular risk. The profile may be modified due to a physical mobilization
or to a reduction in physical activity. Among the lipoproteins, high-density
lipoprotein (HDL) is the most influenced by a reduction in physical activity. We
studied the relationship between HDL level and physical activity in SPI
patients.
Material and methods.-- Sixty-three male SPI patients followed in our unit were
included in this study. Inclusion criteria were: male gender, aged more than 18
years, time since SPI greater than 12 weeks. Demographic variables, and
disease duration were recorded. Patients were evaluated according to their ASA
and the Walking Scale for Spinal Cord Injury (WISCI).
Results.-- Mean age was 41.1 ± 14.1 years, time since SPI 36 months (3–240
months). Mean HDL level was 39.53 ± 9.33. The median motor score was
56.76 ± 21.42 and the mean WISCI score 10.14 ± 5.33. The mean HDL level
was 39.91 ± 9.82 mg/dL in paraplegic patients and 37.54 ± 9.23 in tetraplegic
patients (P = 0.47). There was no significant correlation between HDL level,
WISL, motor score and time since SPI (P = 0.898, 0.55 and 0.27 and r = 0.176,
0.243 and 0.141 respectively.
Conclusion.-- In our study, we were unable to identify a link between walking,
motor score and HDL level in SPI males. The level of walking being only one
element of physical activity, the daily duration of physical activity, and activities
of daily life should also be taken into account.

http://dx.doi.org/10.1016/j.rehab.2012.07.429

Communications affichées
Version française

P041-f
Membres fantômes surnuméraires chez un patient paraplégique
C. Dahan ,*, L. Le Chapelain ,*, J.-M. Beis ,*, M. Kandel ,*, J. Paysant
* CRF Lay-Saint-Christophe, 4, rue du Professeur-Montaut,
54000 Lay-Saint-Christophe, France
b Institut régional de médecine physique et réadaptation, Nancy, France
*Auteur correspondant.
Adresse e-mail : cam.dahan@free.fr.
Introduction.-- Des cas de membres fantômes surnuméraires ont été rapportés
principalement après lésions cérébrales hémisphériques (hémisphère droit).
Chez les blessés médullaires, ce phénomène reste exceptionnel. Dans une
récente revue de la littérature, Curt et al. [1] ont fait état de quatre cas publiés. Il
s’agit presque exclusivement de tétraplégiques incomplets. Nous rapportons ici
la 1ère observation, à notre connaissance, de membres fantômes surnuméraires
chez un patient paraplégique.