

effectiveness of rTMS for PLP, whereas the effectiveness of tDCS is not yet elucidated.

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Keywords Neuromodulation; Phantom limb pain; Systematic review

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Spinopelvic sagittal alignment of people with a transfemoral amputation

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Introduction/Background This study aims to describe the spinopelvic sagittal alignment in transfemoral amputees (TFAs) and to compare with a reference population. To our knowledge, this is the first recent radiologic study of the TFAs' spine and the first postural approach destined to better understand the high prevalence of low back pain (LBP) in the TFAs.

Material and method Volunteers with transfemoral amputation underwent bi-planar X-rays with 3-D reconstructions of the spine and pelvis. Sagittal parameters were analyzed in the light of literature and compared to those of a reference group of non-amputees. Differences between TFAs with and without LBP were also searched.

Results Twelve subjects have been prospectively included. The two groups (TFA-LBP $n=5$ and TFANoP $n=7$) were comparable in terms of gender, age, amputation delay and sedentarity. In the TFALBP group, the impact of LBP was estimated on average to 16.4% with the ODI (SD 7.9%, [6; 24]). Pelvic incidences were within normal limits, except for one subject of the TFA-LPB group. Anterior pelvic tilt was observed in two subjects of each group. Eight subjects (6 NoP and 2 LBP) had abnormal low value of TK. The mean angle of TK in the TFA-NoP group was lower than in the TFA-NoP group ($P=0.0511$). Two subjects of the TFA-LBP group had a hyperlordosis while all the TFAs-NoP had a lower lumbar lordosis than expected in an economic posture. Concerning the sagittal balance, four of the five individuals of the TFA-LBP group had unbalanced sagittal posture versus two of the seven in TFAs-NoP.

Conclusion This study emphasizes the importance of considering the sagittal balance of patients with a transfemoral amputation to prevent and manage the onset of low back pain. Moreover, in this population, it seems necessary to study not only the sagittal plane but also the frontal plane, which is also probably unbalanced.

Keywords Limb amputation; Spinal alignment; Low back pain

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Validation of ABILOCO in Beninese adults with unilateral lower limb amputation using rasch analyses

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Introduction/Background Mobility and locomotion are basic physical needs whose restoration is an important goal of rehabilitation programs for lower limb amputees. The objective of this work is to validate the ABILOCO questionnaire for patients with a lower limb in Benin.

Material and method The preliminary version of ABILOCO included 36 items. Fifty-eight patients with unilateral amputation of the leg or thigh were evaluated with this version. Patients were asked to provide their perceived difficulty in completing each item according to three response categories. Patients were also evaluated with additional measures included: Locomotor Capabilities Index (ICL), Rivermead Mobility Index (RMI), Six-minute walk test. Data were analyzed with the RUMM2030 software. and SigmaStat softwares.

Results Rasch analysis retained 20 items with three response categories. Indeed, 9 items were deleted because they had more than 50% of missing responses; one item was deleted because it had a disordered threshold; 8 items were deleted because they did not fit the model; and two items because had differential functioning. The ABILOCO in Beninese adults with unilateral lower limb amputation had good external validity with the RMI ($r=0.74$ and $P=0.01$) and with the ICL ($r=0.72$ and $P<0.01$) and with the NFAC ($r=0.65$ and $P<0.01$).

Conclusion The ABILOCO in Beninese adults with unilateral lower limb amputation consisted of 20 items at 3-level.

Keywords Lower limb amputation; Locomotion ability; Assessment

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Transcultural adaptation and validation of a French version of the Prosthesis Evaluation Questionnaire (PEQ-F)

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Introduction/Background The Prosthesis Evaluation Questionnaire (PEQ) is a self-questionnaire that assesses quality of life (QoL) of lower limb amputees (LLA). It contains 9 subscales that explore the following areas: ambulation, appearance, frustration, perceived response, residual limb health, social burden, sounds, utility and well-being. An optional addendum of 14 questions that assesses stumbling, falls, attentional load and balance confidence during walking has also been developed and used. Our objective was to



develop a French version of this questionnaire (PEQ-F) and to assess its psychometric properties.

Material and method International recommendations for translation and cross-cultural validation of questionnaires were followed. Fifty-two subjects (age 53 ± 16 , 40 males/12 females, 28/12/12 trans-tibial-grritti-stokes/transfemoral, 21/28/3 ischemic/traumatic/other, years since amputation 10 ± 10) participated. Criterion validity was assessed with the Pearson Correlation Coefficient (PCC) between PEQ-F and other constructs (SF-36, Prosthetic-Profile-of-the Amputee-Locomotor-Capabilities-Index, Amputation-Body-Image-Scale, Brief-Pain-Inventory, Trinity-Amputation-and-Prosthesis-Experience-Scales-Revised, Activities-specific-Balance-Confidence-Scale, Timed Up and Go and 2 minutes Walking Tests). Internal consistency was assessed with the α -Cronbach Coefficient (α) and reliability with the Intra-class Correlation Coefficient (ICC) in 48 subjects who completed the questionnaire twice in a 7-day interval.

Results PEQ-F scores ranged 46–96/100 (76 ± 11). Criterion validity was verified for the PEQ-F ($r = 0.38–0.33$, $P = 0.008–0.03$) and for all tested subscales ($r = 0.32–0.50$, $P = 0.02–0.0002$). Internal consistency was satisfactory ($\alpha = 0.87$). The reliability of the global PEQ-F was excellent (ICC = 0.89[0.82–0.93]), and good to excellent for its subscales (ICC ranging 0.60[0.37–0.75]–0.89[0.82–0.94]). There were no floor or ceiling effect.

Conclusion The French version of the PEQ-F has good psychometric properties, comparable to its original version. It offers a holistic evaluation that helps managing LLA patients and identifying personal needs. We promote the use of the whole questionnaire or part of it for both clinical and research purposes.

Disclosure of interest The authors declare that they have no competing interest.

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Effect of postoperative ambulation level on the quality of life in a trans-tibial amputee

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Introduction/Background Quality of life of a trans-tibial (TT) amputee is not only determined by his functional rehabilitation but also social, economical and psychological rehabilitation. A number of studies have analyzed the influence of lower limb amputation on these factors. This study analysed the effect of functional recovery on other parameters of quality of life in a TT amputee.

Material and method This was a 10 years retrospective and 2 years prospective study. A total of 160 patients of trans-tibial amputation were followed. Their postoperative ambulatory status was calculated using Pinzur's ambulatory level. Their quality of life was determined on the basis of answers to a five-point questionnaire, which included their social, economic and psychological aspects. These parameters were correlated to assess the influence of functional recovery on the quality of life.

Results All the amputees with Pinzur's 0–1 level of ambulation suffered loss of income consequent to loss of job. All of them felt increased level of depression and anxiety after amputation. Fifty percent of the patients with postoperative 0–1 level of ambulation felt socially neglected. Comparatively much less percentage of amputees with 5–6 level of ambulation suffered economic, social and psychological crisis.

Conclusion Quality of life of a TT amputee is determined not only by his functional rehabilitation but also social, economical and psychological factors. From this study we concluded that postoperative functional outcome significantly affects the quality of life of an amputee. An amputee with better ambulation level fares

better economically, psychologically and socially in comparison to an amputee with poor ambulatory outcome.

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Importance of tying the sciatic nerve in above knee amputation to prevent neuroma formation

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Introduction/Background Sciatic nerve is the thickest nerve in human body. Neural sheath of sciatic nerve is rich in microvasculature. In this study we compared neuroma formation after tying the sciatic nerve with leaving its cut end open in patients who undergo above knee amputation.

Material and method In this study, we followed a total of 90 patients who underwent above knee amputation. In half of these patients, cut end of sciatic nerve was left open and in other half, the nerve was tied. Patients in both the groups were age, sex and BMI matched. Neuroma formation in the stump was assessed one year after surgery. This assessment was done by measuring the diameter of sciatic nerve ending using sonogram. Sciatic nerve diameter was measured bilaterally at the same level, and the value of the normal limb was taken as control.

Results Out of 45 patients who underwent tying of sciatic nerve, only 10 patients developed thickening of the cut end of sciatic nerve in comparison to opposite limb. On the other hand, 45 patients in whom the cut end was left open, 33 patients developed neuroma formation. This result was statistically significant.

Conclusion Rich microvasculature of sciatic nerve results in the formation of haematoma beneath the cut end, if it is left open. This haematoma eventually results in growth of neural fibres. As a result of this, neuroma formation occurs at cut end of sciatic nerve in above knee amputation. We thus conclude, it is always wise to tie the cut end of sciatic nerve in above knee amputation to prevent neuroma formation.

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Training of phantom limb movements in trans-humeral amputees increases mobilization capacity and associated residual muscle activation

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Introduction/Background In the light of the development of polydigital hand prosthesis, we recently explored an intuitive control mode by surface EMG associated to phantom limb movements (PLM) in upper arm amputees (Jarrassé et al., 2017a, b). As little was known about PLM, we described types and characteristics of upper limb PLM and explored some factors potentially influencing these in a population of upper limb amputees (De Graaf et al.,

