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Scoliosis

CO180

Impact of orthopedic treatment on the quality of life of adolescents with idiopathic scoliosis: A cross-sectional study

Mariem Rekik, Nadra Gader, Mouna Sghir, Wafa Said, Wassiaa Kessomtini*
Hôpital Tahar-Sfar de Mahdia, médecine physique et réadaptation fonctionnelle, Mahdia, Tunisia
* *Corresponding author.*
E-mail address: mariemr239@gmail.com (W. Kessomtini)

Objective The idiopathic scoliosis (IS) corset could have physical and psychological effect especially in adolescents. The aims of our study were to determine the influence of the Chêneau corset on the quality of life (QOL) of adolescents with an IS and to seek for a correlation between the QOL of adolescents treated with brace and age, Risser Index, correction percentage and corset treatment duration.
Material/patients and methods This was a six-month (September 2016–February 2017) cross-sectional study including 48 adolescents with IS divided into two groups. The first group (G1) included treated with brace and rehabilitated adolescents. The second one (G2) included only those who were reeducated (corset being made, non-evolutive scoliosis or Risser > 4). QOL was assessed by Quality of Life Profile for Spine Deformities (QLPSD), SRS-22 and QOL Visual Analog Scale (VAS).
Results We collected 27 girls (56%) and 21 boys (44%), with a mean age of 14 years ± 2 years (10–18 years). QOL was better in adolescents treated only by rehabilitation with a significant difference ($P < 0.05$). According to the QOL VAS, we objectified a correlation between the QOL and correction percentage. According to QLPSD scale, the overall QOL score of patients wearing the corset was significantly correlated with the percentage of correction and the age. We noted that psychosocial status was significantly correlated with age, percentage correction and duration of treatment with corset. We found a correlation between body image and the correction angle. Dorsal flexibility was correlated with percentage correction and duration of treatment. According to SRS-22, the overall QOL score of the patients wearing the corset was significantly correlated with the correction percentage. We noted a correlation between the psychosocial status and the correction percentage. Satisfaction was correlated with percentage correction and duration of treatment.
Discussion, conclusion Orthopedic treatment in teenagers with IS results in a significant decrease in QOL regardless of the scales. This study shows that a multidisciplinary care should be carried out in order to improve the aesthetics, the pain and the acceptance of the corset and to insist in treatment adherence.
Keywords Scoliosis; Quality of Life; Corset; Rehabilitation
Disclosure of interest The authors have not supplied their declaration of competing interest.

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CO181

Influence of adolescent idiopathic scoliosis on dynamical strategies in the sagittal plane

Anne-Violette Bruyneel[1,*], Serge Mesure[2], Philippe Mahaudens[3]
[1] *HESSO Genève, physiothérapie, Carouge, Switzerland*
[2] *Université Aix-Marseille II, Marseille, France*
[3] *Université catholique de Louvain, orthopédie pédiatrique, Bruxelles, Belgium*
* *Corresponding author.*
E-mail address: violette.bruyneel@laposte.net (A.-V. Bruyneel)

Objective Adolescent idiopathic scoliosis (AIS) is a progressive growth disease that affects dynamic stability during upright stance, lateral step and gait, especially in frontal plane. The aim was to identify for AIS group and control group (CG) the dynamic strategies during 3 movements in sagittal plane: gait initiation, unstable sitting and positional trunk sense.
Material/patients and methods The first test included 10 AIS girls (Cobb > 15°) and 15 healthy subjects (CG). The ground reaction forces (GRF) have been recorded during initiation gait. Force amplitudes, occurrences, impulses and asymmetry index (AI) have been computed. The second test included 12 AIS girls (Cobb > 19°) and 15 healthy subjects. The GRF parameters (force amplitudes, number of oscillations and variability) were studied whilst the subjects maintained their balance in sitting position on a seesaw (anteroposterior destabilization, 10 s). The third test included 13 AIS girls (Cobb > 15°) and 16 healthy subjects. We recorded the positional sense for a target position of 30° of trunk flexion and 10° of extension. For each study, a threshold value of $P < 0.05$ was adopted for ruling out the null hypothesis.
Results Whichever limb was used to initiate gait, the duration was significantly longer for AIS patients than CG ($P < 0.01$). The impulses, occurrences and forces values were greater than CG ($P < 0.05$), especially if the step initiation started with concavity limb. In sitting destabilization, the AIS was associated with an increase of GRF variability, occurrences, delta and the concavity

side duration ($P < 0.03$). In both target positions, the positional error increased for AIS group compared to CG ($P < 0.0008$). The Cobb angle was only correlated with parameters for unstable sitting position ($0.50 \leq r \leq 0.88$) and with the positional error ($0.16 \leq r \leq 0.82$).
Discussion, conclusion The AIS is associated with specific dynamical strategies when the movement is in sagittal plane. In comparison with the frontal plane movement, this direction highlights the link between the severity of curvature and the perturbations.
Keywords AIS; Cobb angle; Sagittal plane; Dynamic strategies
Disclosure of interest The authors have not supplied their declaration of competing interest.

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CO182

Sense of verticality in girls with right thoracic adolescent idiopathic scoliosis (AIS): Evaluation of bottom up and top down mechanisms

Jean-Francois Catanzariti [1,*], Morgane Le Berre [2], Delphine Darchicourt [1], Marc-Alexandre Guyot [3], Alain Chevutshi [4], André Thévenon [2]
[1] *SSR pédiatrique Marc-Sautelet, APF, rachis pédiatrique, Villeneuve-d'Ascq, France*
[2] *CHRU de Lille, médecine physique et réadaptation, Lille, France*
[3] *Hôpital Saint-Philibert, GHICL, médecine physique et réadaptation, Lomme, France*
[4] *IFMKNF, institut de formation en masso-kinésithérapie, Lille, France*
* *Corresponding author.*
E-mail address: jean-francois.catanzariti@orange.fr (J.-F. Catanzariti)

Objective AIS is the most frequent spinal deformity in adolescence, but its etiology remains unknown. We hypothesized that AIS is secondary to perturbation of sense of verticality. Orthostatic postural control is organized, in part, from the vertical gravity, by two mechanisms: bottom up (central integrating of multisensorial inputs) and top down (cognitive process, as notion of self-image representation). We studied sense of verticality in SIA by subjective visual vertical (SVV), postural vertical (VP) and self-image representation, with reference to the vertical gravity.
Material/patients and methods We conducted two prospective multicentre case–control studies. Study 1 aimed at the evaluation of static and dynamic SVV and VP, in two groups. Thirty girls (14.2 ± 1.7 years) with right thoracic AIS ($3.97 \pm 12.9°$), matched to 30 controls (13.9 ± 1.8 years). Study 2 aimed at the evaluation of perception of form trunk with pictorial scale in three groups. Thirty-one girls (13.5 ± 1.3 years) with minor right thoracic AIS, 32 girls (14 ± 0.9 years) with major right thoracic AIS, 30 control girls (13.6 ± 1.3 years). A weighted score is established: higher score reveal worse perception of trunk form.
Results Study 1 found no significant difference in SVV and VP was shifted to the right in right thoracic AIS group: $2.1 \pm 2.2°$ vs. score control group = $0.08° \pm 1.4°$ ($P < 0.001$). Study 2 found a stronger perception of their form trunk, in vertical standing (2.2 ± 1.4) in patients with major AIS, versus minor AIS (1.2 ± 1.1; $P = 0.008$) and versus controls (1.2 ± 1.2; $P = 0.006$).
Discussion, conclusion Our studies show disturbance of sense of verticality in AIS, with somaesthesic graviception disorder. The loss of concordance between central internal representation of verticality and earth-vertical could lead to a perturbation of longitudinal body axis, by impaired postural adjustment of the trunk. AIS could be the result of a reorientation of longitudinal body axis, consequently of spinal axis, in accordance with an erroneous representation of verticality. This model modifies the management of scoliosis AIS.
Keywords Adolescent idiopathic scoliosis; Verticality perception; Postural control; Self-image
Disclosure of interest The authors have not supplied their declaration of competing interest.

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CO183

Does the subject orbit around his eye and how does he lean on standing feet? Study on 100 cases

Philippe Pradier [1,*], Pascal Bourgeois [2], Christian Beyaert [3]
[1] *Orange, France*
[2] *Laboratoire de la performance sportive de la santé et de la cognition ILEPS Cergy, Cergy, France*
[3] *EA DevAH, université de Lorraine, Nancy, France*
* *Corresponding author.*
E-mail address: dr.pp84100@gmail.com (P. Pradier)

Objective Postural control and standing balance involve visual, vestibular, proprioceptive and exteroceptive afferents. The role of the position of the eyes in posture in people with orthopedic disorders of the trunk and/or lower limbs is studied in correlation with the podal supports.
Material/patients and methods In a medical consultation for orthopedic disorders, patients were selected over a continuous period. A standing stabilometry (platform of force with 4 quadrants-51sec-feet at 15°), performed by fixing the right gaze in front measures the distribution of the supports right/left. In frontal photographs, the vertical alignment of the pupils with the center of the intermalleolar line, the centers of the tibiotarsal joints and the inclination of the biscapular line with the horizontal line were analyzed.
Results Of the 99 patients studied (62 scoliosis 7 scoliotic attitudes), the intemalleolar center was aligned vertically with the right eye ($n = 57$) or the left eye ($n = 42$). The bipodal supports were symmetrical for these two groups. When the right eye was vertically aligned with the intermalleolar center, the left eye was aligned with the left tibiotarsus for 88% of cases with a marked biscapular inclination. When the left eye was aligned with the intermalleolar center, the right eye was aligned with the right tibiotarsus in 79% of cases with a moderate average biscapular inclination.
Discussion, conclusion Remarkably, the intermalleolar center constantly aligns vertically with one eye, with a frequent alignment of the second eye with the center of the homolateral tibiotarsal joint, in people with orthopedic disorders affecting the trunk and/or the lower limbs. This postural asymmetry, however, is associated with symmetric loading on feet. Why does the subject not detect this postural shift centered on an eye as fixed point? The role of the action of the eye in this configuration with permanent shift action on the body is source of distance stresses, pain and deformations (Wolf and Delpech's laws and soft tissue adaptation-retraction). The choice of a director's eye organizing the posture is discussed. This might explain correlations between the alignment of the second eye on the left and scoliosis in women.
Keywords Posture; Steering or fixed eye; Bipodal loading; Standing; Scoliosis; Visual anchor; Stabilometry
Disclosure of interest The authors have not supplied their declaration of competing interest.

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CO184

Adolescent idiopathic scoliosis (AIS), cerebrospinal fluid (CSF) flow and ciliopathy

Jean-François Catanzariti [1,*], Lucie D'hulster-Hocquet [2], Morgane Le Berre [2], Charles Delaplace [3], Mokran Boukelifa [3], André Thevenon [2]
[1] *SSR pédiatrique Marc-Sautelet, APF, rachis pédiatrique, Villeneuve-d'Ascq, France*