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SCO SYM

CURRENT TRENDS IN RESEARCH ON SCOLIOSIS AND OTHER SPINAL DEFORMITIES

Book of Abstracts

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Oral Presentations

O 01 DEVELOPMENT OF A QUESTIONNAIRE OF PHYSIOTHERAPEUTIC SPECIFIC SCOLIOSIS EXERCISES - PSSE: A NEW INSTRUMENT FOR MEASURING THE QUALITY OF LIFE OF PSSE TREATED SCOLIOTICS

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INTRODUCTION

Physiothereutic Specific Scoliosis Exercises (PSSE) for Idiopathic Scoliosis (IS) in recent double blinded prospective relevant international published reports are part of the mild deformity treatment options because they reduce the Cobb angle of children with mild IS. The purpose of this work was to create a questionnaire to assess the quality of life of children and adolescents with IS undergoing PSSE, knowing that such a questionnaire has not yet been presented.

METHOD

Using the existing literature on PSSEs, the SOSORT guidelines, but also the existing experience with scoliosis patients in Greece, a series of questions were tailored which is expected to lead to an understanding of the problems faced by scoliosis children and adolescents. Due to the epidemic the co-authors worked through the online Zoom platform to structure the questionnaire.

RESULTS

The questionnaire consists of 8 domains concerning Physical Functioning, Self-Image, PSSEs, Psychosocial Functioning, Cognitive Functioning, Compliance, Motivation and Pain and 53 Likert scale questions (37 with a positive and 15 with a negative meaning), using score 1 - 5 and 6 "open" unscored questions. The best answer in questions with a positive meaning is scored with 5 points and in negative meaning with 1 respectively. The worst score is 53 points (floor score: 53/265) and the best is 265 (ceiling score: 265/265).

DISCUSSION

The questionnaire will contribute to the clinical and research field of the conservative treatment IS with PSSEs. Carrying out and analyzing the results of the competed questionnaires will provide valuable information on the following: a) the ease or difficulty of the exercises and possible suggestions for their improvement, b) the acceptance or not of the exercises by children, adolescents and their families, c) the improvement or not of the physical, cognitive function, self-image, and psychosocial function, d) the obstacles of the integration of PSSEs in their daily life, their continuation and how much these exercises can affect their emotional world, e) the ways of improving the compliance for the execution of the PSSEs, f) the improving the methods of motivation for the realization of the PSSEs and finally g) their effect on pain.

O 02 INVESTIGATION OF TRUNK PROPRIOCEPTION ASYMMETRY IN ADOLESCENT IDIOPATHIC SCOLIOSIS: A PILOT STUDY

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INTRODUCTION

Idiopathic scoliosis (IS) is of unknown origin and is probably due to several causes. Multiple factors could be involved, including neurosensory pathways and proprioception. There is a needed study in the literature in which trunk proprioception and pelvis orientation are valuated in three dimensions in IS.

METHOD

Seven adolescent girls with IS (mean age 12,7 years) who had moderate (21–35) and moderate to severe (36–40) Cobb angle included in the study. Trunk proprioception was measured by active angle reproduction using GyKo (Microgate, Bolzano, Italy) inertial system. The system component was located on the trunk at the level of the C7-T1 vertebrae. The individual was asked to act her trunk with her eyes open and stop when the target angle was reached by the evaluator. Then the individual was asked to close her eyes and came to the target angle actively. The measurement was repeated three times. All data were read from the screen. The deviation amount of each measurement according to the target angle was recorded and the average of the deviation amount in the 3 measurements was calculated. 30 and 45 degrees of trunk flexion, 20 degrees of trunk extension, 20 degrees of lateral flexion, 15 and 30 degrees of trunk rotation were evaluated. The Wilcoxon signed-rank test was used to compare data in statistical analysis.

RESULTS/DISCUSSION

There were differences between the proprioception of 20 degrees of extension of the trunk and the proprioception of 30 and 45 degrees of flexion. The amount of deviation in the extension was lower than that in the flexion. As the trunk flexion angle increased 30 to 45, the deviation of proprioception increased ($z = -2{,}366$, $p = 0{,}018$; $z = -2{,}366$, $p = 0{,}018$).
The amount of deviation in trunk lateral flexion was different between left and right side ($z = -2{,}366$, $p = 0{,}018$). Potential proprioceptive deviations in trunk flexion movement, which is frequently used in activities of daily living, may provide explanatory information in our approach to IS.

CONCLUSION

The deviations of trunk proprioception may differ according to different trunk movements and right-left sides in AIS. These results are preliminary data for the ongoing PhD thesis. The results regarding the proprioception of pelvis orientation will also be presented in a future study.

KEYWORDS: Scoliosis, Proprioception, Adolescent

O 03 THE EFFECT OF KINESIOLOGY TAPPING ON SCHROTH METHOD ON THE FUNCTIONAL CHANGES IN POSTURE AND RESPIRATORY SYSTEM IN OLESCENTS WITH IDIOPATHIC SCOLIOSIS: PILOT STUDY

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BACKGROUND

Scoliosis affects posture and the respiratory system (3). The Schroth method is an effective tool for the treatment of scoliosis. However, there is insufficient evidence for the efficiency of kinesiology taping with the Schroth method to help manage the condition of spinal mobility and respiratory system changes for adolescents with idiopathic scoliosis (2;1).

The aim of the study was to evaluate the efficacy of the Schroth method and the Schroth method with kinesiology taping for posture and in the respiratory system functional changes in adolescents with idiopathic scoliosis.

METHODS

The study included 8 adolescent volunteers diagnosed with idiopathic scoliosis. The adolescents were divided into two groups. The Schroth method was used for the first group and the Schroth method with kinesiology taping for the second group. The study lasted 2 months, and both groups underwent 2 interventions per week. Both before and after the interventions, participants were assessed for trunk functional stability (Mathias test), lumbar and thoracic spine mobility (Schober and Otto tests), vital lung capacity (VC), and forced expiratory capacity in 1 s (FEV1).

RESULTS

In the analyzed results of the interventions, it was found that the Mathias test, the Schober and Otto test, the VC and the FEV1 were improved in both groups. Comparing the results between the groups, it was established that the spinal mobility was better (p 0,05) in the second group. However, lumbar and thoracic spinal mobility, VC, FEV1 were better (p005 in the first group. Conclusions. The Schroth method with and without kinesiological taping increased trunk stability, spinal cord mobility, and VC and FEV1. The Schroth method with kinesio taping is more effective for trunk functional stability, however only the Schroth method is more effective with mobility of the lumbar and thoracic spine part as well as for VC and FEV1.

KEYWORDS

spinal cord mobility, trunk functional mobility, vital capacity

O 04 THE EFFECT OF THE SCHROTH METHOD ON PULMONARY FUNCTION IN PATIENTS WITH SCOLIOSIS. A PILOT STUDY

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INTRODUCTION

Scoliosis can have several impacts, especially in patients with severe spinal deformities. Some of these conditions are related to restrictive lung diseases, cardiovascular disorders and/or malnutrition (De la Garza Ramos et al., 2017). The Schroth Method is the most commonly used and studied method for people with scoliosis or kyphosis (Kwan et al., 2017). The effect of the method on the Cobb angle has been demonstrated by previous studies, in contrast to its effect on pulmonary function which requires further investigation. The aim of the current study was to investigate the effect of the Schroth Method on pulmonary function.

METHODS

3 women diagnosed with scoliosis, mean age 34.67±22.3 years and mean Cobb angle 28.67º±10º, met the criteria to participate in the study. The baseline evaluation of spirometry and diffusion test were performed at the Spirometry and Diffusion Laboratory of the Pulmonary Clinic, University Hospital of Larissa. In addition, the Cobb angle was measured using Surgimap®, the quality of life using the SRS-22 questionnaire and the intensity of pain with the NRS. The intervention lasted a total of about three months. With the completion of the intervention, the above parameters were re-evaluated.

RESULTS/DISCUSSION

Both spirometry and diffusion indices showed not statistically but clinically significant improvement. FVC (Mean improvement=0.12L, p=0.109), FEV1 (Mean improvement=0,1L, p=0,285), DLCO/VA (Mean improvement=0.01 mmol/min/kPak/L, p=1,000). In parallel, clinically significant improvement showed the SRS-22 questionnaire (Mean improvement=43, p=0,109), the Cobb angle (Mean improvement=6º, p=0,109), as well as pain on NRS (Mean improvement=5, p=0,102).

CONCLUSION

The Schroth BSPTS Method is a safe and effective method for treating patients with scoliosis. Although, the results were statistically not significant because of the small sample, they showed that the intervention with this method can clinically improve the values of spirometry and diffusion indices for pulmonary function, as well as it has the potential to improve the Cobb angle, the quality of life of patients (SRS-22), as well as pain intensity (NRS).

KEY WORDS

SCHROTH METHOD, PULMONARY FUNCTION, SCOLIOSIS, QUALITY OF LIFE, PAIN, COBB ANGLE

O 05 COMPARISON OF BEFORE AND AFTER THE PANDEMIC: SCHOOL SCREENING FOR SCOLIOSIS IN A DISTRICT IN SOUTHEAST TURKEY

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INTRODUCTIONSchool screening is an early and easy method in the detection of scoliosis. It is predicted that scoliosis will increase after the pandemic process. This study aimed to compare the results of school screening for scoliosis before and after the pandemic in a district (Oguzeli, Gaziantep) in Turkey that we routinely follow up.

METHODS

This study was conducted with 797 secondary school students in total at two secondary schools with the participation of 538 students in March 2020 before the pandemic and 259 students in March 2022 after the pandemic. The angle of trunk rotation was assessed by the Adams' forward bending test with a scoliometer (Baseline). Data were expressed as percentage and frequency.

RESULTS/DISCUSSION

Before the pandemic, while 305 of 538 students (57%) (mean age 13.1±1.0) trunk rotation was not observed, while 51 students (9.4%) had greater than or equal to 5° angle of trunk rotation (≥5°). After the pandemic, while the angle of trunk rotation was 0° in 166 of 259 students (64%) (mean aged 13.0±1.0) evaluated, greater than or equal to 5° was detected only in six students (2.3%).

CONCLUSION

The percentage of students who had the angle of trunk rotation greater than or equal to five decreased interestingly after the pandemic. Future studies included long-term follow-up results are needed. The schools in the study are in a rural area and socioeconomically lower than the center of the city. It is valuable to interpret the results from this perspective as well.

KEYWORDS

Scoliosis, School screening, Prevalence

O 06 DIRECT EFFECTS OF OSTEOPATHIC DIAPHRAGMA RELAXATION TECHNIQUES ON MOBILITY AND CHEST DEFORMATION IN PATIENTS WITH ADOLESCENT IDIOPATHIC SCOLIOSIS: A PILOT STUDY

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In many studies, the diaphragm is presented only as the respiratory muscle. With the development of medical science and knowledge about scoliosis, its importance has grown significantly. In patients with scoliosis, mobility of the chest is disturb, and the breathing pattern may change.

The aim of this study was to assess the effectiveness of osteopathic techniques in improvement of chest mobility and correction in patient with adolescent idiopathic scoliosis (AIS).

MATERIAL AND METHODS

The study involved 6 girls with AIS age 10-16 years (body weight 45.41 ± 4.21 kg, height 160.23 ± 9.91cm). Patients who had history of spine surgery or had a brace treatment were excluded from the study. In this study, an osteopathic relaxation techniques (ORT) protocol focusing on the diaphragm was applied to the patients in: prone position - the crus of the diaphragm, supine position – central tendon and dome. The parameters of scoliosis and deformation of the chest, i.e. the angle of trunk rotation (ATR), and the level of the chest position were measured using the Bunnell scoliometer. The chest mobility was assessed with the chest mobility index. The patients were examined before and directly after the application of therapeutic procedures which included osteopathic diaphragm relaxation techniques and placebo therapy.

RESULTS

After ORT the average value of decrease of ATR in thoracic region was 1.4 where after the placebo therapy the average value was three times lower. Unfortunately, differences was not statistically significant. Whereas chest mobility was improved after therapy.

CONCLUSIONS

The ORT on the diaphragm has a positive effect on chest mobility in girls with AIS. It seems to be value element of scoliosis therapy.

O 07 PERCEPTION OF BODY IMAGE AND SPINAL DEFORMITY IN ADOLESCENT IDIOPATHIC SCOLIOSIS: THE CULTURAL ADAPTATION OF THE GREEK VERSION OF THE SPINAL APPEARANCE QUESTIONNAIRE (SAQ)

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BACKGROUND
The perception of body image in AIS is an important construct for the young patients, measured by the Spinal Appearance Questionnaire. The initial study and all cultural adaptations have shown its validity, reliability and responsiveness. However, there is no published Greek version of the SAQ until today.

PURPOSE
The aim of this study was to develop a valid and reliable Greek version of the Spinal Appearance Questionnaire (GR-SAQ).

METHODS
A sample of 61 AIS patients was employed. The internal consistency using Cronbach's α and the test-retest reliability using the Intraclass Correlation Coefficient (ICC) were examined. The GR-SAQ and the domain "Appearance" of the GR-SRS-22 were correlated in order to assess convergent validity. The Cobb angle and the "Trunk shift" domain were compared to further evaluate the convergent validity. Divergent validity was demonstrated by the relationship between the GR-SAQ "Kyphosis" domain with the Cobb Angle, the Angle from Formetric 4D Diers and the scoliometer angle using the Pearson's (r) statistic. Discriminant validity was assessed by analyzing the relationship between SC-SAQ scores and patients' characteristics. Ethical Approval was granted on the 22-2-2018 (University-of-West-Attica Ethics Committee)

RESULTS
The internal consistency was shown to be good (Cronbach's α= 0.794). Test-retest reliability was excellent with ICC= 0.931 (95%CI: 0.880 – 0.960). Correlation between GR-SAQ and the "Appearance" domain of GR-SRS-22 demonstrated a Negative low- moderate correlation (r = -0.351, p = 0.006). The "Trunk" shift domain had moderate correlation with the Cobb Angle (r = 0.393, p = 0.002). No statistical significance (p>0.05 at all cases) was noted among the GR-SAQ and the patients' characteristics, "Kyphosis" domain and the Cobb angle, the Formetric 4D Diers angle, and the scoliometer angle.

CONCLUSIONS
The GR-SAQ was shown to be a valid and reliable tool with similar psychometric properties to the original, capable to assess the perception of the spinal deformity in Greek AIS patients.

KEYWORDS
Spinal Appearance Questionnaire (SAQ), cross-cultural validity,
Adolescent Idiopathic Scoliosis

O 08 COMPLETE NON-OPERATIVE TREATMENT WITH BRACE AND SCOLIOSIS SPECIFIC EXERCISES CAN BE EFFECTIVE FOR SEVERE SCOLIOTIC CURVES EXCEEDING 40O AT PEAK OF GROWTH

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INTRODUCTION

According to Scoliosis Research Society (SRS) surgical indication for Adolescent Idiopathic Scoliosis (AIS) is above 40°. Our purpose was to investigate the efficacy of a combined therapy with brace and Physiotherapeutic Scoliosis Specific Exercises (PSSE) in severe scoliosis.

METHODS

Ongoing prospective study with intention to treat analysis. 48 patients (47 females and 1 male) received treatment by Cheneau type brace and PSSE. Our inclusion criteria were Cobb angle >40°, Risser stage 0-2, age > 10 years, less than 1-year post-menarche. Average Cobb angle was 55.3° for thoracic curves (41° – 85°) and 52.6° (40° – 78°) for lumbar curves, mean Risser 0.6 and age 12.4 years. 10 curves were single and 38 double. Compliance was self-reported. Outcome parameters were Cobb angle post-treatment, Angle Trunk Rotation (ATR), TRACE scale and SRS-22 questionnaire score. Mean follow-up was 36.3 months. Statistical analysis performed by paired t-test.

RESULTS

Totally, 24 (50%) subjects remained stable, 13 (27.1%) improved 5° and 11 (22.9%) progressed > 5°. Cobb angle post-treatment significantly improved (52.8°, p=0.05 for thoracic and 47.4°, p= 0.02 for lumbar curves). A statistically significant reduction was reported for ATR, thoracic reduced from 12.8° to 10.3° (p=0.01) and lumbar from 11.6° to 9.7° (p=0.02). TRACE scale also significantly decreased from 8.4 to 6.2 (p=0.008) and SRS-22 total score improved from 73.4 to 79.6 (p=0.004). Mean in-brace correction (IBC) was 32.3% for thoracic and 27.4% for lumbar curves. In progressed cases was 13.5% for thoracic and 23.6% for lumbar, while in improved cases 49.3% and 32.7% respectively. A curve type analysis revealed statistically significant better IBC for single (49.9% thoracic - 50.9% lumbar) compared to double curves (27.2% thoracic - 25.5% lumbar). In double curves progression rate was 28.9% and in single curves 0% (p=0.0003).

DISCUSSION

Conservative treatment achieved a success rate of 77.1% in scoliotic curves above 40o in a group with a high risk of progression at the peak of growth. A significant improvement was detected for trunk rotation (ATR), body symmetry and quality of life.

CONCLUSIONS

Non-operative treatment by bracing and PSSE can effectively treat severe scoliosis. The results were significantly better in single than double curves.

O09 EFFECT OF CLINICAL PILATES ON SCOLIOSIS AND OTHER SPINAL DEFORMITIES. LITERATURE REVIEW

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INTRODUCTION

Pilates is a system of exercise focusing on mobilization, stretching and breathing. Pilates has become very popular today, not only for physical fitness but also for rehabilitation programs. It is still unclear if Pilates is conductive to reducing spinal deformity and improve symptoms connected to scoliosis. The aim of this review is to investigate the effects of Clinical Pilates on scoliosis and other spinal deformities.

METHODS

Searches were conducted in 4 scientific databases (PubMed, PEDro, Scopus and Medline) to identify articles that tested the results of Pilates on Cobb angle, quality of life, pain, trunk mobility. The inclusion criteria had to do with the research methodology (only randomized control trials, systematic reviews and meta-analyses were selected), the keywords had to be referred in the title and the articles had to be published in the last decade. Case or series reports, non-scientific articles and articles published prior to 2012 were excluded from this review.

RESULTS

he review included 5 scientific articles. The results indicated that Pilates exercises can be effective in reducing the Cobb angle, evening the weight distribution, increasing the trunk mobility, lowering the pain level and improving the health-related quality of life in patients with idiopathic and non-structural scoliosis.

CONCLUSION

Pilates exercise programs may be beneficial to patients with idiopathic or non-structural scoliosis and improve trunk range of motion, relieve pain, reduce the Cobb angle and improve quality of life. Compared to the Schroth exercises, Pilates exercises seem to be less effective when it comes to reducing the Cobb angle and managing the weight distribution. There is need for further research in these many areas, and especially into the benefits of particular Pilates exercises in the rehabilitation of specific conditions in patients with scoliosis.

KEYWORDS

Pilates, scoliosis, spinal deformities, spine stability/mobility, trunk mobility.

SCO SYM

e-Posters

P 01 THE EFFECTS OF CORRECTIVE EXERCISE IN POSTURE AND QUALITY OF LIFE IN HYPERKYPHOTIC ELDERLY

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Thoracic hyperkyphosis is a spinal deformity of the sagittal plane that characterized by an excessive convexity of the spine more than 40-45°. Hyperkyphosis is associated with weak lung function, impair activities of daily living and poor quality of life. In the elderly the risk of falls and fractures are elevated. Corrective exercise can enhance postural balance and quality of life by decreasing thoracic angle and improving functional mobility. The purpose of this study was to identify the effects of corrective exercise for thoracic hyperkyphosis on posture and quality of life in the elderly. Four studies met the inclusion criteria since 2016 involving 203 subjects. Three studies assessed quality of life using SF-36 or Health-related quality of life (HRQoL) and postural balance using the degree of kyphotic angle. One study explored only the possible differences on kyphotic angle after corrective exercise. After the intervention, all four studies revealed significant results (p<o.o5) in postural balance in experimental groups as kyphotic angle decreased. In two out of three studies, quality of life measured by SF-36 enhanced in most of the measured aspects (pain, function, limitations, mental health). Contrariwise, on the other study HRQoL didn't have a significant effect after therapy. Other studies agreed with the current results regarding kyphotic angle, but the sample included younger participants. Further research should be made towards the elderly including quality of life and postural balance.

KEYWORDS
Hyperkyphosis; Corrective exercise; Posture; Quality of life; Elderly

P 02 ASSESSMENT OF PRESSURE PAIN TREFOLD IN PATIENTS WITH ADOLESCENT IDIOPATHIC SCOLIOSIS

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INTRODUCTION
Pain in idiopathic scoliosis seems to be a very controversial issue. Chronic back pain has an impact in the quality of life of patients with adolescent idiopathic scoliosis (AIS).

PURPOSE
The purpose of this study was to determine the level of the pressure pain threshold (PPT) of muscle erector spinal in patients with AIS. The specific objectives of the study were: first, to compare the level of the PPT of muscle erector spinal in the lumbar and thoracic curve of scoliosis, and second to compare the PPT of the soft tissues of the concave and convex side of the curve.

MATERIAL AND METHODS
The study included 28 girls with AIS being under conservative treatment (ISST Schroth and Cheneau brace). The PPTs were tested in habitual sitting position utilizing the Wagner algometer [N/ cm^2].

RESULTS
No significant differences were found between lumbar and thoracic part of the spine. The mean PPT values measured at the apex of thoracic curve of scoliosis on the concave side were 65.07 ± 25.23, whereas PPT values measured at the apex of thoracic curve of scoliosis on the convex side were 67.61 ± 24.45, albeit no statistically significant difference was found. A statistically significant measurements of the PPT of the erector spinal muscle decrease only in the concave side of the lumbar curve (p=0.0435).

CONCLUSION
From these data the following conclusions can be drawn: it seems to be legitimate to apply corrective breathing (ISST Schroth therapy) in the concave side of the curve in AIS patients as it influences on the muscle tension.

KEYWORDS
adolescent idiopathic scoliosis, ISST Schroth therapy, pressure pain threshold

P 03 RADIOLOGICAL INVESTIGATION OF SCOLIOTIC YOUNG AGE WOMEN PATIENTS IN ORDER TO TREAT SCOLIOTIC CHRONIC SPINE PAIN

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INTRODUCTION

In order to perform an optimal conservative pain killer therapy a radiological investigation was performed.

MATERIAL-METHODS

12 female age patients, with chronic spine problems, were included in this study. Range of age between 20 and 40 years old and mean age 38,5 years. We perform in all of them clinical examination, pain scale evaluation and appropriate radiological exams with x-ray, 3d ct and mri-images. Appropriate pain killer management after, was performed after clinical and radiological evaluation. The follow up was between 24 and 36 months.

RESULTS-CONCLUSIONS

In 9 cases we achieved optimal results and in 3 moderate results. In all of them the radiological appropriate exams were very useful in order to perform conservative pain killer management and also orthotic management using appropriate orthotic systems, in order to ameliorate the health related quality of life and preserve the quality of life.

P 04 RADIOLOGICAL INVESTIGATION OF SCOLIOTIC MIDDLE AGE MALE PATIENTS IN ORDER TO TREAT SCOLIOTIC THORACIC AND LUMBAR PAIN

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INTRODUCTION

In order to perform an optimal conservative pain killer therapy a radiological investigation was performed.

MATERIAL-METHODS

10 middle male age patients were included in this study. Range of age between 45 and 65 years old and mean age 56,5 years. We perform in all of them clinical examination, pain scale evaluation and appropriate radiological exams with x-ray, 3d ct and mri-images. Appropriate pain killer management after, was performed after clinical and radiological evaluation. The follow up was between 12 and 24 months.

RESULTS-CONCLUSIONS

In 8 cases we achieved optimal results and in 2 moderate results.In all of them the radiological appropriate exams were very useful in order to perform conservative pain killer management and also orthotic management using appropriate orthotic systems, in order to ameliorate the health related quality of life and preserve the quality of life.

P 05 RADIOLOGICAL INVESTIGATION OF SCOLIOTIC GOLDEN AGE MALE PATIENTS IN ORDER TO TREAT SCOLIOTIC LUMBAR PAIN

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INTRODUCTION

In order to perform an optimal conservative pain killer therapy a radiological investigation was performed.

MATERIAL-METHODS

10 golden male age patients were included in this study. Range of age between 85 and 95 years old and mean age 88,5 years. We perform in all of them clinical examination, pain scale evaluation and appropriate radiological exams with x-ray, 3d ct and mri-images. Appropriate pain killer management after, was performed after clinical and radiological evaluation. The follow up was between 6 and 12 months.

RESULTS-CONCLUSIONS

In 9 cases we achieved optimal results and in 1 moderate results.In all of them the radiological appropriate exams were very useful in order to perform conservative pain killer management and also orthotic management using appropriate orthotic systems, in order to ameliorate the health related quality of life and preserve the quality of life.

P 06 PELVIC OBLIQUITY AND NEUROMUSCULAR SCOLIOSIS IN PATIENTS WITH CEREBRAL PALSY. A NARRATIVE REVIEW

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INTRODUCTION

Scoliosis is a common musculoskeletal problem for individuals with cerebral palsy. The risk of NM scoliosis increases with aging, disability level according to GMFCS and MACS scales and movement disorder, more often in dystonic type. Spinal deformity can be attributed to a variety of etiologies like muscle weakness, asymmetric tone, truncal imbalance and poor postural control. Neuromuscular scoliosis often leads to an imbalance in musculoskeletal mechanics that extends to the pelvis..Pelvic obliquity (PO) is a common finding in this population and is defined as an asymmetry of pelvis in the coronal plane and may be flexible or fixed.

METHODS

A literature search was performed in Pubmed, Medline and Scope from June to July 2022 for studies related to pelvic obliquity and scoliosis in individuals with cerebral palsy. We combined the terms "Pelvic obliquity", "scoliosis", "neuromuscular scoliosis", "cerebral palsy". We included studies in english language, published in the last decade.

RESULTS/ DISCUSSION

Ten (10) studies turned out to meet the inclusion criteria. Pelvic obliquity is a common finding in individuals with cerebral palsy. Findings on the relationship between pelvic obliquity and the emergence or progression of scoliosis are inconclusive but most studies reported an association. The causes can be suprapelvic, infrapelvic or intrapelvic. Neuromuscular scoliosis in cerebral palsy with hip contractures and structural deformities fall into these causes

CONCLUSIONS

There is a strong association between the high side of PO and the convexity of scoliosis (opposite to the convex side), the hip with the highest displacement and the most reduced range of hip abduction. PO can result in pain mainly due to impingement of the pelvis to the ribs, ulcers and difficulties in sitting and standing positions affecting individuals' functional ability. There is currently no standard method for the determination of the PO angle. Interventions designed to reduce scoliotic curves (like surgery/fusion) an to release tissue structures (stretching, bracing) can correct pelvic obliquity and restore better alignment

KEYWORDS

pelvic obliquity, scoliosis, neuromuscular scoliosis, cerebral palsy

P 07 THE EFFECT OF SCOLIOSIS ON DIAPGRAGMATIC FUNCTION

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INTRODUCTION

It is stated that scoliosis, a common musculoskeletal disorder, is the spinal deformity of the vertebrae which is characterized by a lateral curvature greater than 10 degrees and rotation. Scoliosis could be congenital or secondary to systemic and neuromuscular diseases or idiopathic diseases, the latter being the most common (Karaali et al. 2021). It has been stated that the convex or concave deformities of the thorax, formed by the rotation of the vertebrae in scoliotic patients, can lead to pulmonary function disorders by decreasing lung volumes and thoracic wall compliance (Tsiligiannis and Grivas, 2012; White et al. 2015). As a result, scoliosis has direct effects on many aspects of the respiratory system function and the purpose of this review is a discussion on how scoliosis is affecting diaphragmatic function.

METHOD

For this purpose, PubMed/MEDLINE and Google Scholar databases were searched for relevant articles. The search terms used were scoliosis, diaphragm, diaphragmatic function, pulmonary function, and respiratory function.

RESULTS

12 articles were included in the present review.

DISCUSSION

Decreased lung capacity, respiratory muscle function, and exercise capacity are complications commonly presented in patients with scoliosis. Different areas of the large diaphragmatic muscle have varying structures of the muscle itself and tendineum. Different types of scoliosis can result in altered diaphragmatic structure. It has been observed that scoliosis can cause respiratory muscle weakness and the scoliotic patients have reduced fatigue duration during mild physical activity when compared with healthy subjects. These dysfunctions appear to be related to the severity of scoliosis curvature (Mohammadi et al. 2014). It has also been cited that diaphragm thickness decreased in the scoliotic patients. Furthermore, as the Cobb angle increased, the end-inspirium thickness of the diaphragm decreased. In the same study, it has been noted that the patients with severe scoliosis presented lower FVC and FEV1 (Karaali et al. 2021).

CONCLUSION

Scoliosis, depending on the severity, causes respiratory function disorders and respiratory muscle weakness, affecting the diaphragmatic function.

P 08 COMPARISON OF POSTURAL CONTROL IN GIRLS WITH ADOLESCENT IDIOPATHIC SCOLIOSIS AND THEIR HEALTHY PEERS

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The present understanding of the mechanisms responsible for postural deficit in adolescent idiopathic scoliosis (AIS) is still insufficient.

This is influential because it is known that AIS is often accompanied by balance deficits.

The purpose of this study was to compare postural control in girls with AIS and their healthy peers.

The postural control system was assessed in 72 subjects: the study group of 24 patients with AIS and a control group (CON) of 48 healthy adolescents. In this study we compared the center-of-pressure (COP) indices of 24 patients with AIS to 48 CON during four 20-s quiet stance trials with eyes open (EO) or closed (EC) and on firm or foam surface.

On the basis of COP recordings, the spatial and temporal COP parameters were computed.

Sway entropy was the only COP parameter that revealed intergroup differences at the main effects level. This main effect of Group ($F(1,70) = 9.60$, $p = 0.0028$) showed higher sway irregularity in AIS than in CON. There was also the Group × Vision interaction ($F(1,70) = 4.24$, $p = 0.043$) indicating that closing the eyes reduced sway entropy to a greater extent in the AIS group than in CON. The reduced entropy with eyes closed may indicate a more conscious balance in these conditions. After changing the surface from hard to foam, puzzling changes in sway fractality were revealed. This may suggest some problems with the perception of body axes in patients and reveals a hitherto unknown cause of their balance deficit.

KEYWORDS

Adolescent idiopathic scoliosis, postural control

P 09 THE EFFECTIVENES OF PHYSIOTHERAPEUTIC SCOLIOSIS SPECIFIC EXERCISES (PSSE) IN ADOLESCENCE IDIOPATHIC SCOLIOSIS (AIS). A SINGLE – CASE CLINICAL STUDY.

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AIM

To evaluate the effectiveness of complete conservative treatment (Physiotherapeutic Scoliosis Specific Exercises-PSSE and brace) in a 13-year-old adolescent with idiopathic scoliosis (AIS).

METHODS

For this teenager, a 3-month individually-tailored PSSE intervention was performed in a physiotherapy practice twice per week. Outcome measures included clinical and radiographic evaluations as well as patient self-reported outcomes. Aesthetic appearance was evaluated with TRACE (Trunk Aesthetic Clinical Evaluation) clinical tool, where 4 trunk areas (shoulders, scapulae, hemi-thorax, waist) were assessed for asymmetries from posterior-anterior photographs. Thoracic-angle of trunk rotation (T-ATR) and lumbar-angle of trunk rotation (L-ATR) were measured with Mizuho OSI scoliometer. Upper & lower chest expansion (UCE, LCE) were measured with a standardized tape measuring technique. All measurements were undertaken monthly by the same examiner (physiotherapist). Quality of life was evaluated with SRS-22 (Scoliosis Research Society-22) questionnaire at baseline, and with Brace Questionnaire (Br-Q) during brace treatment. Thoracic and lumbar Cobb angles (with and without brace) were computed via radiographs. Risk of cobb angles' progression was calculated with Lonstein formula. Exercise compliance at clinic and at home were also reported by the examiner and the girl's mother, respectively. Descriptive statistics were used for the analysis.

RESULTS/DISCUSSION

TRACE revealed 100% improvement of aesthetic appearance. At 3 months, T-ATR and L-ATR results revealed 20% improvement in both angles. UCE and LCE yielded 100% improvements. SRS-22 and Br-Q revealed baseline high scores, indicating good quality of life. Baseline Cobb angles were 32° (T-Cobb) and 35° (L-Cobb). After brace fitting, angles dropped at 24° and 16°, respectively. Risk of progression with Lonstein formula revealed 80% and 90% risk for T-Cobb and L-Cobb, respectively, before brace fitting. While In-brace, percentages dropped to 35% (T-Cobb) and 5% (L-Cobb). Compliance with PSSE was 100% in clinic and 88,89% at home.

CONCLUSIONS

A 3-month individually tailored PSSE program seems to be effective in improving aesthetic appearance, T-ATR, L-ATR, UCE and LCE of a 13-year-old teenage with AIS. Conservative treatment (PSSE and brace) appears to reduce the risk of progression in highly compliant AIS patients.

KEYWORDS

PSSE, AIS, Aesthetics, QoL, Cobb, ATR, UCE

P 10 SCOLIOSIS IMAGING

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INTRODUCTION

Scoliosis is a condition in which the spine develops abnormal curvature and rotation. Scoliosis may result from various structural causes, although the most common form is called idiopathic scoliosis. Imaging plays a very important role in determining the underlying etiology and in monitoring the changes of the deformity that take place with growth.

METHODS

We conducted a literature search through the Science databases PubMed, Medline and ScienceDirect in order to review the current imaging methods in the diagnosis and monitoring of patients with scoliosis.

RESULTS

Radiography is generally used in the initial diagnosis of the condition. Postero-anterior erect full spine radiograph is generally prescribed, and is supplemented by lateral full spine radiograph when indicated.

MR imaging or CT indicated when the presence of an underlying osseous or neurologic cause is suspected. Both examinations are useful preoperative and postoperative tools and also used determine degenerative changes resulting from abnormal forces produced from scoliosis or from spinal fusion.

Nuclear medicine has a limited role in the routine evaluation of scoliosis. A bone scan can be performed more often in the postoperative spine to identify complications and postoperative infection. Moreover, hybrid imaging with SPECT/CT provides the different imaging modalities in a single image, providing information on post-surgical inflammatory sites or specific actions of new bone formation or reabsorption which are not apparent with other techniques such as MR or CT.

Lastly, EOS muscle skeletal diagnostic imaging system is a novel technique in scoliosis imaging. EOS scan is a low-dose X-ray technology.

It can simultaneously provide a global 3d quantitative analysis of scoliotic deformities, using significantly less radiation than traditional X-rays or CT scans.

CONCLUSION

Imaging modalities such as radiography, computed tomography (CT), and magnetic resonance (MR) imaging play pivotal roles in the diagnosis, monitoring, and management of scoliosis, with radiography having the primary role both for the initial study and follow-up It is thus the gold standard in the evaluation and management of scoliosis curves. When available, EOS should be used in order to reduce the radiation hazard.

KEYWORDS

Imaging, Radiography, Scoliosis

P 11 THE EFFECTS OF EXERCISE IN OLDER ADULTS WITH HYPERKYPHOSIS: A SCOPING REVIEW

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INTRODUCTION

Hyperkyphosis is the most common spinal deformity in older adults. Increased thoracic kyphosis (kyphosis angle greater than 40°) is associated with several significant health consequences, including back pain, impaired physical function, impaired pulmonary function, impaired balance, falls, fractures, decreased functionality and quality of life,, limitation in daily activity, and even earlier mortality. The evaluation and treatment of hyperkyphosis is challenging due to the lack of standardized diagnostic criteria and evidence-based treatment options. Treatment modalities are currently in use, including surgery, bracing, and physiotherapy. The aim of this review is to investigate the effects of exercise in older adults with hypekyphosis.

METHODS

Medline and Google scholar databases were searched from June to July 2022 for studies related to exercise interventions in older adults above 60 years of age. All types of exercise interventions (such as strengthening, stretching, yoga, and/or any other exercise with a focus on treatment or prevention of postural malalignment) were included. The key words used were "hyperkyphosis", "exercise", "older adults".

RESULTS

In the present review ten (10) studies were included presenting the results of 677 older adults with hyperkyphosis. The exercise interventions specific exercises including spine strengthening (strengthening of back and abdominal muscles), poses of yoga and postural alignment, flexibility and respiratory muscle exercises. Duration of exercised programmes varied from 6 weeks (1 study), 8 weeks (3 studies), 12 weeks (4 studies) and 6 months (3 studies). Exercise adherence was generally good in studies.

CONCLUSIONS

Low to moderate evidence suggest that exercise in age related hyperkyphosis have a role in the management of this group of patients. It can be beneficial in order to improve postural control, spinal stability and improve kyphosis outcomes. The adherence reported across studies suggests that exercise is an acceptable treatment option for people with age-related hyperkyphosis Types of exercise and dose-response parameters of exercise eliciting improvement warrant further investigation. Due to heterogeneity in clinical trials, future research is needed with the goal of improving the health of our growing geriatric population.

P 12 TWO – DIMENTIONAL DIGITAL PHOTOGRAPHY SPECIFICATIONS FOR SCOLIOSIS EVALUATION USING AN INNOVATIVE MOBILE APPLICATION

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Body posture is defined as the alignment of body segments which is considered as an important health indicator [1]. Normal human posture is the characteristic of the vertical position which relies on spinal alignment and its position over the patient's head and pelvis [3, 4].

Scoliosis is a common back disease which identifies with an irregular spinal condition. The usual scoliosis assessment can be implemented in many ways, such as x-ray, scoliometer and photogrammetry, or with the combination of the above methods. For the clinicians, posture evaluation plays a role in the global health assessment. Especially an early diagnosis of scoliosis just by using the camera of a smartphone may be very practical and painless. Smartphones are increasingly incorporated with features such as sensors and high-resolution cameras that empower their capabilities, enabling their use for varied activities including human posture assessments [2]. In this article we are going to examine the best practices of a scoliosis screening examination using a mobile application. A clinical protocol of scoliosis examination will be followed in order to succeed the standardization of posture assessment with digital photography. The user will receive instructions for the requirements and specifications (i.e., camera resolution, camera position – distance and height, child positioning, lower limb positioning—the feet, Lower limbs positioning—the knees, head position and gaze direction, etc.) through the application for taking two-dimensional digital photography for child body posture evaluation.

During the examination procedure the application provides instructions for a standardized technique, reliable parameters and normative data for the age of 7-15 years. Using proper image processing, markers will be placed in the proper points (shoulders, intergluteal cleft and lines parallel to the ground) and finally using machine learning techniques Cobb angle will be calculated [5]. This app will be available to everyone and tries to make an early screening diagnosis of the disease, since there are no symptoms. Our preliminary, but promising, results will be confirmed further by piloting the mobile app with a larger sample to be conclusive.

P 13 IMPROVEMENT OF THRORACOLUMBAR SCOLIOSIS WITH PSSE AND BRACING

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ABSTRACT

To evaluate PSSE and Bracing treatment for adolescent Idiopathic Scoliosis

OBJECTIVE

This report of one case illustrates the potential effect of chiropractic manipulative therapy on back pain and curve progression in the at-risk, skeletally immature patient with adolescent idiopathic scoliosis.

CLINICAL FEATURES

A 5 year-old girl experienced right thoracolumbar Scoliosis of 40 degrees Ange Cobb. She received Physiotherapeutic Scoliosis Specific Exercises (PSSE)and brace treatment for 1 year,.

INTERVENTION AND OUTCOME

This patient was treated with PSSE two times per week for 1year and brcing for 18hours/day. After 12 months of consecutive Treatment the Cobb angle decreased by 18°. Futhermore there was improvement on othe measures : AVR, Scoliometer (from 6 degrees to 4),function, strength, balance of the patient

CONCLUSIONS

PSEE and Bracing was associated with a reduction in the degree of curvature of adolescent idiopathic scoliosis in this case. This suggests that a treatment with PSEE and Bracing is effective on Scoliosis and decrease the need for surgery."

KEYWORDS

Scoliosis, PSSE,SCHROTH

P 14 ARE THERE ANY RELATIONSHIPS BETWEEN PARASPINAL MUSCLE CHARACTERISTICS AND SPINAL CURVATURE IN CONSERVATIVELY TREATED CHILDREN WITH ADOLESCENT IDIOPATHIC SCOLIOSIS? A SYSTEMATIC REVIEW STUDY

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BACKGROUND
Adolescent idiopathic scoliosis (AIS) is a common tridimensional spinal deformity among adolescents that may compromise their physical and psychological well-being. While prior studies identified some unique paraspinal muscles characteristics in these patients, no systematic review has summarized the relationships between various characteristics of paraspinal muscles and spinal curvature.

OBJECTIVES
To summarize the evidence regarding the relationships between various paraspinal muscle characteristics and spinal curvature.

METHODS
Five scientific databases (i.e., CINAHL, Academic Search Premier, MEDLINE, Scopus, and PubMed) were searched from inception to May 2022. Two independent reviewers screened abstracts and full texts, extracted data, and evaluated methodological quality and quality of evidence.

RESULTS
Of 1,530 identified citations, Four cohort, 17 cross-sectional, and 24 case-control studies with low to high risk of bias were included. Low to very low-quality evidence supported that the convexity of the curve had more type I muscle fibers, higher muscle volume and paraspinal muscle activity, while the concavity had more intramuscular fatty infiltration. Very low-quality evidence substantiated no significant difference in the side-to-side surface electromyography signals during submaximal isometric contraction between people with and without AIS. However, low to very low-quality evidence supported that the side-to-side surface electromyography ratio predicted curve progression.

CONCLUSION
Muscle volume, thickness and activity seemed to be predominantly higher on the convex side, while fat infiltration and atrophy was higher on the concave side. While our results indicated significant relationships between paraspinal muscle characteristics and spinal curvature in AIS cases, future studies should clarify their causal relationships. This prompts future research to investigate the possible etiology of AIS because it may change the trajectory of treatment approaches to AIS.