SOSORT

INTERNATIONAL SOCIETY ON SPINAL ORTHOPAEDIC AND REHABILITATION TREATMENT

NEWSLETTER Nº 3-2009

EDITORIAL:

Dear Members and Colleagues,

After our meeting in Lyon, where Jean Claude De Mauroy was an excellent host, lots of proposals and suggestions are being exchanged. These proposals and comments will make us grow as Society and as a professionals for the wellness of the patients. Again we want to underline that this positive behaviour is fundamental for our society and has to be accomplished in every activity of the society. That's why we encourage all of you to be part of it and not let it die for the benefit of our patients.

After a prosperous precidency, Dr. Theodoros B. Grivas passed the medal to Dr. Tomasz Kotwiski, who opens the current edition with the Presidencial Letter.

We are glad to announce the 7th annual meeting of SOSORT, next year will be held in Montréal and hosted by Dr. Charles Rivard . Inspiring you to present new investigations.

Wishing you good holidays.

M.Villagrasa, P. Pizzetti.

EDITORIAL: PRESIDENTIAL LETTER - July 2009

SOSORT PRESIDENT: Tomasz KOTWICKI, MD

The International Society on Scoliosis Orthopedic and Rehabilitation Treatment - SOSORT - continues to grow up. Physicians, physiotherapists, orthotists, psychologists, nurses – all healthcare professionals caring for scoliosis patients – have found a common place to discuss research, share experiences and introduce ideas. Annual Meetings bring together an increasing number of participants from all the continents. The SOSORT 2009 Lyon Meeting was an unforgettable experience from the scientific, the educational, and from the social point of view. Next year we are scheduled to meet in Montreal, a city famous for excellent scoliosis research and treatment. In the following years we will visit the cities of Barcelona and Milano, where we are sure that the Society will be delighted by their warm hospitality.

The Official Journal of the Society – "Scoliosis" – publishes regularly a spectrum of scoliosis-centered research. The open access policy makes the visibility and the impact score of the publication very impressive, and authors publishing in Scoliosis will see this in the access statistics. New scientists should be very encouraged about publication in this journal. As I observe the energy and commitment of the Editor-in-Chief, supported by a circle of expert reviewers, I am convinced of the bright future of the Scoliosis Journal.

SOSORT Committees have a busy agenda between Annual Meetings to support the organization and prepare for the next meeting. This activity is completed at a distance to allow participation of members from across the globe, and it has been very successful. Committees are open to receive new volunteer members, and this provides a great opportunity for scoliosis-oriented professionals who are early in their career to build an international colleagues and to participate in important professional work.

The Clinical and Consensus Committee prepares the next Consensus procedure which will be carried out in Montreal. This year, the topic is the nomenclature of spinal deformities. The Consensus procedure follows the Delphi method, and has become a good tradition within the Society. The knowledge and experience of specialists from all over the world can be summarized using this process, so the SOSORT Consensus articles are carefully read and regularly cited.

Education remains a primary focus of the Society. Educational sessions held at the meetings, workshops, and informal discussions between individual members are all valuable resources for those who participate. New SOSORT courses will be developed and improved. Many important educational initiatives are created by the SOSORT Educational Committee, which is one of the largest committees in the Society. More details on the SOSORT Education initiatives will follow, but anyone who is interested in this activity should contact the committee chair to volunteer to participate.

The Scientific and Research Committee is announcing a new project titled: "SOSORT Supports Research". Committee members have found that early-career researchers may need substantial assistance in developing and carrying out relevant research projects. This project will attempt to assist clinicians, especially physiotherapists, in developing research ideas and obtaining grant money to get them started. You can find an announcement of this important project in this SOSORT Newsletter. As an initial resource, a brief guideline on how to construct a scientific study has been prepared. It is designed to help the beginning researcher prepare a research proposal in a way that will attract funding and produce successful data and conclusions on the first try. It is important for clinicians who believe in conservative management of scoliosis to contribute research that will help balance the belief that surgical treatment is the best approach to scoliosis. While it is also possible to have conservative over-treatment, it is important that we provide a voice for proponents of conservative management by publishing credible scientific evidence of its success.

I hope you will continue to support the efforts of our Society in order to improve the

quality of care for our patients.

I wish you all very enjoyable holidays.

Tomasz Kotwicki, MD
SOSORT President 2009/2010

Poznan, July 2009

NEWS:

Sosort Board's News:

The **SOSORT Board** carefully evaluated the feedback that was provided by the participants of the workshops. The Board continues to support the concept of these workshops, and wants them to be an essential part of the educational experience at the conference. Improvements will be made in these workshops based on the evaluation from this year, and focus will be placed on practical knowledge, active participation, and small group interaction, whenever possible.

Committees' News:

SOSORT Scientific and Research Committee

Chair: Tomasz Kotwicki
Members: Toru Maruyama, Jacek Durmala, Josette Bettany-Saltikov
Project 1: Assistance to researchers of conservative scoliosis management in constructing of their studies

It is desirable that the publications concerning pathology and conservative treatment of idiopathic scoliosis are correctly planned from the point of view of current standards of medical research (Evidence Based Medicine). The professionals of scoliosis care (physiatrists, orthopedists, physiotherapists, psychologists, orthotists, others) may need substantial assistance to prepare and construct relevant research projects. Thus, the idea of helping the novice researchers in writing research projects has raised:

SOSORT supports research

Aim: to help the professionals of scoliosis care in preparation of methodologically correct studies

Participants: the professionals of scoliosis care: physiatrists, orthopedists, physiotherapists, psychologists, orthotists, others.

Methods: We invite the researchers to present their research project to the SOSORT Scientific and Research Committee. The project should be written in English. It should be sent by the responsible person (Project Manager) via the SOSORT secretariat (sosort@isico.it) to the Chair of the Committee (Dr Tomasz Kotwicki). The project should

contain the following: Title, Authors, Background, Study design, Aim, Hypothesis, Inclusion criteria, Exclusion criteria, Methods, Significance. The SOSORT Committee assures to the authors the confidence of the project. The project will be examined by the members of the SOSORT Scientific and Research Committee, the comments and proposals of improvement will be addressed to the authors. The final version, after being modified or completed according to SOSORT suggestions may have been attributed the mention: The research project untitled … has been examined and approved by the SOSORT Scientific and Research Consensus Committee . A certificate may be provided to the authors to be presented when applying for the financial support at their home institutions and countries.

Guidelines for writing a research project:
Think your ideas over.
Read as much as possible of what has been published on the idea you have.
Write your thoughts in order as follows.

Title: try to make it detailed. Avoid general title type "Physical efficiency in girls with scoliosis". The title can follow the PICO format (Population, Intervention, Comparative group, Outcomes from Evidence Based Practice).

Background: write the most relevant state of the knowledge; use up to 20 references; the references should comprise mainly articles published in peer-reviewed journals; limit the use of manuals, book of proceedings, course materials as references.

Study design: means how your study is constructed: for cohort studies - prospective, prospective controlled, randomized, retrospective; cross-sectional study, case control study. If you don't know what type of study it can be, describe in details how you will get the data.

Aim: write clearly what exactly you would like to check or prove.

Hypothesis: write a scientific hypothesis in form of a sentence, for example: "Lumbar idiopathic scoliosis does not limit sport activity more than the thoracic idiopathic scoliosis having the same Cobb angle". The hypothesis will be subjected to verification during your research. In statistical approach usually the zero hypothesis (H0) and the alternative hypothesis (H1) are constructed. They are contradictory each other, so the results of the study will approve one and deny the other one. Try to write the two hypotheses in order to clearly formulate the alternative.

Inclusion criteria: enumerate all the criteria, for example sex, age, curve type, Cobb, Risser, follow-up, etc. Once your study starts, when adding a new patient, you have to respect the inclusion criteria. More narrow and restricted inclusion criteria, more difficult to gather a relevant number of patients, however more powerful the study in terms of finding significant relations among the parameters. Consult your statistician to know the optimal sample size (number of patients). Please, describe how you plan to get ethical approval for your study.

Exclusion criteria: describe in details which patients will not enter your study. Do not forget, the lack of the informed consent from the patient and the parents is an exclusion criterion.

Methods: This is an essential part of the project and should be described in details. Please write it as much in detail, as like writing for a non professional. Do not limit the description "Trunk balance will be examined"; provide information, how it will be examined. You can also follow a methodology published before and cite the proper article in the References

section. Even then it is recommended to write it down in your project.

Significance: why do you think it worth to undertake the study.

SCIENTIFIC EVENTS:

44th SRS annual meeting and course. 23rd-26th September 2009, San Antonio, Texas, USA.

Eurospine 2009 – October 21-24, 2009 Warsaw, POLAND

7th SOSORT Annual Meeting – May 19-22, 2010 Montreal CANADA

IRRSD Biannual Meeting – July 1-3, 2010 Montreal CANADA

REVIEW OF LITERATURE:

SCOLIOSIS JOURNAL Update (February 2009 - July 2009)

Reviews:

Historical overview of spinal deformities in ancient Greece
Elias S Vasiliadis, Theodoros B Grivas, Angelos Kaspiris

Little is known about the history of spinal deformities in ancient Greece. The present study summarizes what we know today for diagnosis and management of spinal deformities in ancient Greece, mainly from the medical treatises of Hippocrates and Galen. Hippocrates, through accurate observation and logical reasoning was led to accurate conclusions firstly for the structure of the spine and secondly for its diseases. He introduced the terms kyphosis and scoliosis and wrote in depth about diagnosis and treatment of kyphosis and less about scoliosis. The innovation of the board, the application of axial traction and even the principle of trans-abdominal correction for correction of spinal deformities have their origin in Hippocrates. Galen, who lived nearly five centuries later impressively described scoliosis, lordosis and kyphosis, provided aetiologic implications and used the same principles with Hippocrates for their management, while his studies influenced medical practice on spinal deformities for more than 1500 years.

Scoliosis in patients with Prader Willi Syndrome – comparisons of conservative and surgical treatment
Hans-Rudolf Weiss, Deborah Goodall

In children with Prader Willi syndrome (PWS), besides growth hormone (GH) therapy, control of the food environment and regular exercise, surgical treatment of scoliosis deformities seems the treatment of choice, even though the risks of spinal surgery in this specific population is very high. Therefore the question arises as to whether the risks of

spinal surgery outweigh the benefits in a condition, which bears significant risks per se. The purpose of this systematic review of the Pub Med literature was to find mid or long-term results of spinal fusion surgery in patients with PWS, and to present the conservative treatment in a case study of nine patients with this condition.

Researches:

Relatively lower body mass index is associated with an excess of severe truncal asymmetry in healthy adolescents: do white adipose tissue, leptin, hypothalamus and sympathetic nervous system influence truncal growth asymmetry?
Theodoros B Grivas, R Geoffrey Burwell, Constantinos Mihas, Elias S Vasiliadis, Georgios Triantafyllopoulos, Angelos Kaspiris

In healthy adolescents normal back shape asymmetry, here termed truncal asymmetry (TA), is evaluated by higher and lower subsets of BMI. The study was initiated after research on girls with adolescent idiopathic scoliosis (AIS) showed that higher and lower BMI subsets discriminated patterns of skeletal maturation and asymmetry unexplained by existing theories of pathogenesis leading to a new interpretation which has therapeutic implications (double neuro-osseous theory).
5953 adolescents age 11-17 years (boys 2939, girls 3014) were examined in a school screening program in two standard positions, standing forward bending (FB) and sitting FB. The sitting FB position is thought to reveal intrinsic TA free from back humps induced by any leg-length inequality. TA was measured in both positions using a Pruijs scoliometer as angle of trunk inclinations (ATIs) across the back at each of three spinal regions, thoracic, thoracolumbar and lumbar. Abnormality of ATIs was defined as being outside 2 standard deviations for each age group, gender, position and spinal region, and termed severe TA.
In the sitting FB position after correcting for age, relatively lower BMIs are statistically associated with a greater number of severe TAs than with relatively higher BMIs in both girls (thoracolumbar region) and boys (thoracolumbar and lumbar regions). The relative frequency of severe TAs is significantly higher in girls than boys for each of the right thoracic (56.76%) and thoracolumbar (58.82%) regions ($p=0.006$, 0.006, respectively). After correcting for age, smaller BMIs are associated with more severe TAs in boys and girls.
BMI is a surrogate measure for body fat and circulating leptin levels. The finding that girls with relatively lower BMI have significantly later menarche, and a significant excess of TAs, suggests a relation to energy homeostasis through the hypothalamus. The hypothesis we suggest for the pathogenesis of severe TA in girls and boys has the same mechanism as that proposed recently for AIS girls, namely: severe TAs are initiated by a genetically-determined selectively increased hypothalamic sensitivity (up-regulation, i.e. increased sensitivity) to leptin with asymmetry as an adverse response to stress (hormesis), mediated bilaterally mainly to the growing trunk via the sympathetic nervous system (leptin-hypothalamic-sympathetic nervous system (LHS) concept). The putative autonomic dysfunction is thought to be increased by any lower circulating leptin levels associated with relatively lower BMIs. Sympathetic nervous system activation with asymmetry leads to asymmetries in ribs and/or vertebrae producing severe TA when beyond the capacity of postural mechanisms of the somatic nervous system to control the shape distortion of the trunk. A test of this hypothesis testing skin sympathetic responses, as in the Rett syndrome, is suggested.

Towards an understanding of the information and support needs of surgical adolescent idiopathic scoliosis patients: a qualitative analysis

Radha MacCulloch, Sandra Donaldson, David Nicholas, Joyce Nyhof-Young, Ross Hetherington, Doina Lupea, James G Wright

Informed decision making for adolescents and families considering surgery for scoliosis requires essential information, including expected outcomes with or without treatment and the associated risks and benefits of treatment. Ideally families should also receive support in response to their individual concerns. The aim of this study was to identify health-specific needs for online information and support for patients with adolescent idiopathic scoliosis who have had or anticipate having spinal surgery.
Focus group methodology was chosen as the primary method of data collection to encourage shared understandings, as well as permit expression of specific, individual views. Participants were considered eligible to participate if they had either experienced or were anticipating surgery for adolescent idiopathic scoliosis within 12 months, were between the ages of 10 and 18 years of age, and were English-speaking. Two focus groups consisting of 8 adolescents (1 male, 7 female) and subsequent individual interviews with 3 adolescents (1 male, 2 female) yielded a range of participant concerns, in order of prominence: (1) recovery at home; (2) recovery in hospital; (3) post-surgical appearance; (4) emotional impact of surgery and coping; (5) intrusion of surgery and recovery of daily activities; (6) impact of surgery on school, peer relationships and other social interactions; (7) decision-making about surgery; (8) being in the operating room and; (9) future worries.
In conclusion, adolescents welcomed the possibility of an accessible, youth-focused website with comprehensive and accurate information that would include the opportunity for health professional-moderated, online peer support.

Surgical complications in neuromuscular scoliosis operated with posterior- only approach using pedicle screw fixation

Hitesh N Modi, Seung-Woo Suh, Jae-Hyuk Yang, Jae Woo Cho, Jae-Young Hong, Surya Udai Singh, Sudeep Jain

There are no reports describing complications with posterior spinal fusion (PSF) with segmental spinal instrumentation (SSI) using pedicle screw fixation in patients with neuromuscular scoliosis. Fifty neuromuscular patients (18 cerebral palsy, 18 Duchenne muscular dystrophy, 8 spinal muscular atrophy and 6 others) were divided in two groups according to severity of curves; group I (< 90°) and group II (> 90°). All underwent PSF and SSI with pedicle screw fixation. There were no anterior procedures. Perioperative (within three months of surgery) and postoperative (after three months of surgery) complications were retrospectively reviewed. There were fifty (37 perioperative, 13 postoperative) complications. Hemo/pneumothorax, pleural effusion, pulmonary edema requiring ICU care, complete spinal cord injury, deep wound infection and death were major complications; while atelectesis, pneumonia, mild pleural effusion, UTI, ileus, vomiting, gastritis, tingling sensation or radiating pain in lower limb, superficial infection and wound dehiscence were minor complications. Regarding perioperative complications, 34(68%) patients had at least one major or one minor complication. There were 16 patients with pulmonary, 14 with abdominal, 3 with wound related, 2 with neurological and 1 cardiovascular complications, respectively. There were two deaths, one due to cardiac arrest and other due to hypovolemic shock. Regarding postoperative complications 7 patients had coccygodynia, 3 had screw head prominence, 2 had bed sore and 1 had implant loosening, respectively. There was a significant relationship between age and increased intraoperative blood loss ($p = 0.024$). However it did not increased complications or need for ICU care. Similarly intraoperative blood loss > 3500 ml, severity of curve or need of pelvic fixation did not increase the complication rate or need for ICU. DMD patients had higher chances of coccygodynia postoperatively. Although posterior-only approach

using pedicle screw fixation had good correction rate, complications were similar to previous reports. There were few unusual complications like coccygodynia.

Specific exercises performed in the period of brace weaning can avoid loss of correction in Adolescent Idiopathic Scoliosis (AIS) patients: Winner of SOSORT's 2008 Award for Best Clinical Paper

Fabio Zaina, Stefano Negrini, Salvatore Atanasio, Claudia Fusco, Michele Romano, Alessandra Negrini

Exercises are frequently performed in order to improve the efficacy of bracing and avoid its collateral effects. Very frequently there is a loss of correction during brace weaning in AIS treatment. Aim: To verify the efficacy of exercises in reducing correction loss during brace weaning. Study Design: Retrospective controlled study. Population: Sixty-eight consecutive patients (eight males), age 15+/-1 and Cobb angle 22+/-2degrees at start of brace weaning.
The start of brace weaning was defined as the first visit in which the wearing of brace for less than 18/24 hours was prescribed (according to our protocol, at Risser 3). Patients were divided into two groups according to whether or not exercises were performed: (1) EX (exercises), included 39 patients and was further divided into two sub-groups: SEAS (who performed exercises according to our institute's protocol, 14 patients) and OTH (other exercises, 25 patients) and (2) CON (controls, 29 patients) that was divided into two other sub-groups: DIS (discontinuous exercises, 19 patients) and NO (no exercises, 10 patients). Cobb angles and ATR were evaluated at the start and after complete brace weaning. Complete brace weaning was defined as the first visit in which the brace was no longer prescribed (ringapophysis closure or Risser 5, according to our protocol). ANOVA and Chi Square tests were performed.
There was no difference between groups at baseline. However, at the end of treatment, 2.7 years after the start of the weaning process, Cobb angle increased significantly in both the DIS and NO groups (3.9degrees and 3.1degrees Cobb, respectively). The SEAS and OTH groups did not change. Comparing single groups, OTH (with respect to DIS) had a significant difference ($P<0.05$).
Exercises can help reduce the correction loss in brace weaning for AIS.

Real time noninvasive assessment of external trunk geometry during surgical correction of adolescent idiopathic scoliosis

Luc Duong, Jean-Marc Mac-Thiong, Hubert Labelle

The correction of trunk deformity is crucial in scoliosis surgery, especially for the patient's self-image. However, direct visualization of external scoliotic trunk deformity during surgical correction is difficult due to the covering draping sheets.
An optoelectronic camera system with 10 passive markers is used to track the trunk geometry of 5 scoliotic patients during corrective surgery. The position of 10 anatomical landmarks and 5 trunk indices computed from the position of the passive markers are compared during and after instrumentation of the spine.
Internal validation of the accuracy of tracking was evaluated at 0.41 +/- 0.05 mm RMS. Intra operative tracking during surgical maneuvers shows improvement of the shoulder balance during and after correction of the spine. Improvement of the overall patient balance is observed. At last, a minor increase of the spinal length can be noticed.
Tracking of the external geometry of the trunk during surgical correction is useful to monitor changes occurring under the sterile draping sheets. Moreover, this technique can used be used to reach the optimal configuration on the operating frame before proceeding to surgery. The current tracking technique was able to detect significant changes in trunk geometry caused by posterior instrumentation of the spine despite significant correction of the spinal curvature. It could therefore become relevant for computer-assisted guidance of

surgical maneuvers when performing posterior instrumentation of the scoliotic spine, provide important insights during positioning of patients.

Unspecific chronic low back pain - a simple functional classification tested in a case series of patients with spinal deformities

Hans-Rudolf Weiss, Mario Werkmann

Up to now, chronic low back pain without radicular symptoms is not classified and attributed in international literature as being "unspecific". For specific bracing of this patient group we use simple physical tests to predict the brace type the patient is most likely to benefit from. Based on these physical tests we have developed a simple functional classification of "unspecific" low back pain in patients with spinal deformities.
Between January 2006 and July 2007 we have tested 130 patients (116 females and 14 males) with spinal deformities (average age 45 years, ranging from 14 years to 69) and chronic unspecific low back pain (pain for > 24 months) along with the indication for brace treatment for chronic unspecific low back pain. Some of the patients had symptoms of spinal claudication (n = 16). The "sagittal realignment test" (SRT) was applied, a lumbar hyperextension test, and the "sagittal delordosation test" (SDT). Additionally 3 female patients with spondylolisthesis were tested, including one female with symptoms of spinal claudication and 2 of these patients were 14 years of age and the other 43yrs old at the time of testing.
117 Patients reported significant pain release in the SRT and 13 in the SDT (>/= 2 steps in the Roland & Morris VRS). 3 Patients had no significant pain release in both of the tests (< 2 steps in the Roland & Morris VRS). 117 Patients reported significant pain release in the SRT and 13 in the SDT (>/= 2 steps in the Roland & Morris VRS). 3 Patients had no significant pain release in both of the tests (< 2 steps in the Roland & Morris VRS).
Pain intensity was high (3,29) before performing the physical tests (VRS-scale 0–5) and low (1,37) while performing the physical test for the whole sample of patients. The differences where highly significant in the Wilcoxon test ($z = -3,79$; $p < 0,0001$).
In the 16 patients who did not respond to the SRT in the manual investigation we found hypermobility at L5/S1 or a spondylolisthesis at level L5/S1. In the other patients who responded well to the SRT loss of lumbar lordosis was the main issue, a finding which, according to scientific literature, correlates well with low back pain. The 3 patients who did not respond to either test had a fair pain reduction in a generally delordosing brace with an isolated small foam pad inserted at the level of L 2/3, leading to a lordosation at this region.

Treatment of chronic low back pain in patients with spinal deformities using a sagittal re-alignment brace

Hans-Rudolf Weiss, Mario Werkmann

For adult scoliosis patients with chronic low back pain bracing is initially indicated before spinal surgery is considered. Until recently there has been a lack of research into the effect upon pain reductions in the mid and long-term. Promising results have been documented in short-term studies for the application of a sagittal re-alignment brace in patients with spinal deformities and along with pain; however mid-term and long-term results are not yet available. The purpose of this study is to investigate the mid-term effects of this brace with respect to pain control.
67 patients (58 females and 9 males) with chronic low back pain (> 24 months) and the diagnosis of scoliosis or hyperkyphosis were treated with a sagittal re-alignment brace (physio-logic brace™) between January 2006 and July 2007. The indication for this kind of brace treatment was derived from a positive sagittal re-alignment test (SRT) and the exclusion of successful conservative treatment during the last 24 months. The aim of this type of conservative intervention was to avoid surgery for chronic low back pain.
The average pain intensity was measured on the Roland and Morris VRS (5 steps) before

treatment. This was 3.3 (t1), at the time of brace adjustment it was 2.7 (t2) and after at an average observation time of 18 months it was 2.0 (t3). The differences were highly significant in the Wilcoxon test.
Short-term measurements showed that a significant pain reduction is possible in chronic postural low back pain using a sagittal re-alignment brace inducing lumbar re-lordosation. In a preliminary report at adjustment (t2), highly significant improvements of pain intensity have also been demonstrated. At 6 months of treatment however, no improvement was measured. The improvement of the mid-term effects (18 months) found in this study compared to the preliminary report may be due to the changed approach to compliance: whilst the bracing standard was not changed; the patients in this study were obligated to wear the brace for a minimum of 20 hrs per day for the first 6 months of treatment.
The effect of the sagittal re-alignment brace leads to promising short-term improvements in patients with chronic low back pain and spinal deformities. Contrary to unspecific orthoses, which after a short period without persistent pain reduction are omitted by the patients, the sagittal re-alignment brace (physio-logic™ brace) leads to an effective reduction of pain intensity in mid-term even in patients who have stopped brace treatment after the initial 6 months of treatment. In conservative treatment of chronic low back pain specific approaches such as the sagittal re-alignment brace are indicated prior to considering the surgical options.

Top 10 most accessed articles for last 30 days.

1. Accesses 734
Research
Physical exercises in the treatment of idiopathic scoliosis at risk of brace treatment – SOSORT consensus paper 2005
Hans-Rudolf Weiss, Stefano Negrini, Martha C Hawes, Manuel Rigo, Tomasz Kotwicki, Theodoros B Grivas, Toru Maruyama, members of the SOSORT
Scoliosis 2006, **1**:6 (11 May 2006)

2. Accesses 8556
Review
Rate of complications in scoliosis surgery – a systematic review of the Pub Med literature
Hans-Rudolf Weiss, Deborah Goodall
Scoliosis 2008, **3**:9 (5 August 2008)

3. Accesses 506
Research
Juvenile idiopathic scoliosis treated with posterior arthrodesis and segmental pedicle screw instrumentation before the age of 9 years: a 5-year follow-up
Ahmet Yılmaz Şarlak, Halil Atmaca, Levent Buluç, Bilgehan Tosun, Resul Musaoğlu
Scoliosis 2009, **4**:1 (6 January 2009)

4. Accesses 498
Research
Specific exercises performed in the period of brace weaning can avoid loss of correction in Adolescent Idiopathic Scoliosis (AIS) patients: Winner of SOSORT's 2008 Award for Best Clinical Paper
Fabio Zaina, Stefano Negrini, Salvatore Atanasio, Claudia Fusco, Michele Romano,

Alessandra Negrini
Scoliosis 2009, **4**:8 (7 April 2009)

5. Accesses 454
Methodology
Indications for conservative management of scoliosis (guidelines)
SOSORT guideline committee, Hans-Rudolf Weiss, Stefano Negrini, Manuel Rigo, Tomasz Kotwicki, Martha C Hawes, Theodoros B Grivas, Toru Maruyama, Franz Landauer
Scoliosis 2006, **1**:5 (8 May 2006)

6. Accesses 454
Case Report
Rare causes of scoliosis and spine deformity: experience and particular features
Konstantinos C Soultanis, Alexandros H Payatakes, Vasilios T Chouliaras, Georgios C Mandellos, Nikolaos E Pyrovolou, Fani M Pliarchopoulou, Panayotis N Soucacos
Scoliosis 2007, **2**:15 (23 October 2007)

7. Accesses 428
Research
Surgical complications in neuromuscular scoliosis operated with posterior- only approach using pedicle screw fixation
Hitesh N Modi, Seung-Woo Suh, Jae-Hyuk Yang, Jae Woo Cho, Jae-Young Hong, Surya Udai Singh, Sudeep Jain
Scoliosis 2009, **4**:11 (7 May 2009)

8. Accesses 366
Research
Towards an understanding of the information and support needs of surgical adolescent idiopathic scoliosis patients: a qualitative analysis
Radha MacCulloch, Sandra Donaldson, David Nicholas, Joyce Nyhof-Young, Ross Hetherington, Doina Lupea, James G Wright
Scoliosis 2009, **4**:12 (8 May 2009)

9. Accesses 362
Case Report
Adult scoliosis can be reduced through specific SEAS exercises: a case report
Alessandra Negrini, Silvana Parzini, Maria Gabriella Negrini, Michele Romano, Salvatore Atanasio, Fabio Zaina, Stefano Negrini
Scoliosis 2008, **3**:20 (16 December 2008)

10. Accesses 269
Case Report
Undiagnosed osteoid osteoma of the spine presenting as painful scoliosis from adolescence to adulthood: a case report
George Sapkas, Nicolas E Efstathopoulos, Michael Papadakis
Scoliosis 2009, **4**:9 (27 April 2009)

Medline – Pubmed:

Genetics:

Estrogen receptor polymorphysm, estrogen content and idipopathic scolisosis in human: A possible genetic linkage.
Esposito T, Uccello R, Caliendo R, Di Martino GF, Carnevale UA, Cuomo S, Ronca D, Varriale B.

A novel locus for adolescent idiopathic scoliosis on chromosome 12p.
Raggio CL, Giampietro PF, Dobrin S, Zhao C, Dorshorst D, Ghebranious N, Weber JL, Blank RD.

Evaluation

Gait in adolescent idiopathic scoliosis: energy cost analysis.
Mahaudens P, Detrembleur C, Mousny M, Banse X.

Characterizing Torso Shape Deformity in Scoliosis Using Structured Splines Models.
[No authors listed]

Three-dimensional analysis of thoracic apical sagittal alignment in adolescent idiopathic scoliosis.
Hayashi K, Upasani VV, Pawelek JB, Aubin CE, Labelle H, Lenke LG, Jackson R, Newton PO.

Range data pre-processing for the evaluation of torso shape and symmetry in scoliosis.
Ajemba PO, Kumar A, Durdle NG, Raso VJ.

Polish adaptation of scoliosis research society-22 questionnaire.
Glowacki M, Misterska E, Laurentowska M, Mankowski P.

Validity and reliability of an adapted german version of scoliosis research society-22 questionnaire.
Niemeyer T, Schubert C, Halm HF, Herberts T, Leichtle C, Gesicki M.

Curve progression in idiopathic scoliosis: follow-up study to skeletal maturity.
Tan KJ, Moe MM, Vaithinathan R, Wong HK.

A validated finite element analysis of nerve root stress in degenerative lumbar scoliosis.
Kim HJ, Chun HJ, Kang KT, Lee HM, Kim HS, Moon ES, Park JO, Hwang BH, Son JH, Moon SH.

Reliability and validity of adapted French Canadian version of Scoliosis Research Society Outcomes Questionnaire (SRS-22) in Quebec.
Beauséjour M, Joncas J, Goulet L, Roy-Beaudry M, Parent S, Grimard G, Forcier M, Lauriault S, Labelle H.

Reliability analysis for manual radiographic measures of rotatory subluxation or lateral listhesis in adult scoliosis.
Freedman BA, Horton WC, Rhee JM, Edwards CC 2nd, Kuklo TR.

Assessment of spinal flexibility in adolescent idiopathic scoliosis: suspension versus side-bending radiography.
Lamarre ME, Parent S, Labelle H, Aubin CE, Joncas J, Cabral A, Petit Y.

Classification of scoliosis deformity three-dimensional spinal shape by cluster analysis.
Stokes IA, Sangole AP, Aubin CE.

How do scoliotic women shrink throughout life?
Gremeaux V, Casillas JM, Benatru I, Herisson C, Perennou D.

Gait in adolescent idiopathic scoliosis: kinematics and electromyographic analysis.
Mahaudens P, Banse X, Mousny M, Detrembleur C.

Dynamical asymmetries in idiopathic scoliosis during forward and lateral initiation step.
Bruyneel AV, Chavet P, Bollini G, Allard P, Berton E, Mesure S.

Three-dimensional classification of thoracic scoliotic curves.
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Patients associations

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