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Adults with idiopathic scoliosis: progression over 5 Cobb degrees is predicted by menopause and metabolic bone disease.

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Background
According to the current knowledge, in idiopathic scoliosis adults’ curves exceeding 50 Cobb degrees are expected to progress one Cobb degree per year on average. Therefore, regular follow-up is recommended. Following up patients with spine deformities for all life is costly, and a better knowledge of the natural history would provide a better selection of subjects to be followed up in a shorter period, thus optimizing costs. Aging and spine degeneration play a role in the progression process, but which factors could be potentially involved as determinants of progression have never been investigated.

Objective
The aim was to analyze the factors determining a minimum 5 Cobb degrees curve progression in a large cohort of adults followed up for a 5-year minimum period.

Methods
Design Retrospective longitudinal cohort study. Participants we extracted a sample of 767 adults according to the following inclusion criteria: aged >20 years, idiopathic scoliosis curves above 10 Cobb degrees, two or more x-rays over a minimum 5-year period, no spine surgery before the entry date.
Primary curve progression exceeding 5° Cobb degrees as a binary variable. Cobb angle measures have been evaluated in consecutive x-rays (2 at minimum) during a 5-year minimum follow up.
Prognostic factors: Age at x-ray as the time variable. Baseline characteristics (gender, thoracic localization of the primary curve, bone metabolic disease, bone and joint inflammatory disease, referred back pain, neurologic associated disease, brace during growth and menopause).
Statistics: Population average model for binary logistic regression. The crude OR guided the choice of the explanatory variables to be included in the multivariate the significance level was set with $p<0.05$. ROC curve was used to check the discrimination ability of the model.

Results
Females were 88.8%, Cobb degrees at the baseline were Cobb 41.2±15.3, entry date mean age was 34.0+-12.4, 47.8+-13.0 at the last available x-ray. 421 (54.9%) subjects had a progression exceeding 5 Cobb degrees, while 220 (28.7%) progressed ten or more Cobb degrees. Brace treated patients during growth were 288 (37.6 %). The proportion of women in menopause was 25%. A bone metabolic disease was reported for 69 patients (9%). Patients with a neurologic disease were 41 (5.4%) and 44 referred a bone and joints diseases; 512

(66.8%) referred backpain. Bone and metabolic disease exposed subjects to 64% higher odds of 5 Cobb degrees progression at the primary curve (CI95% 1.18-2.27). Patients in menopause had 80% higher odds of 5 Cobb degrees progression (CI95% 1.36-2.38). The present results reflect and confirm previous findings: the kinetics of progression is increased by 0.40 when age is over 50 (CI95% 0.3-0.5).

Conclusion

In patients with bone metabolic disease, age over 50, and in menopause, we encourage a shorter follow-up period. Larger analysis with longer follow up are needed to provide a better understanding of adult scoliosis.