

Spring Distraction System™ (SDS)

100
newton.

How was the spring force
chosen?

A question from surgeons at
Deformity Down Under, Melbourne.



Research set the range

How much force can a growing spine take?

The thesis of Justin Lemans, "The power of Springs to treat Scoliosis", combines a review of the literature with Finite Element Modelling (FEM) data on distraction forces. Its meta-analysis estimated safe limits by age.

200 N

age 5 to 6

250 N

age 7 to 8

300 N

age 9 and older

Estimated safe distraction force, paediatric spine, safety factor 4. Lemans JVC et al. J Biomech. 2021, 124:110571.

Lengthening in steps

High and intermittent.

Traditional growing rods are lengthened in steps. Each lengthening brings a peak force of 300 to 500 newton.

The literature links these repeated high-force distractions to:

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- stiffening of the spine
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- spontaneous fusion of the growing spine (autofusion)
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- smaller gains with every lengthening

Sankar WN et al. Spine. 2011, 36(10):806-809. Cahill PJ et al. Spine. 2010, 35(22):E1199-E1203. Peak forces: Lemans JVC et al. J Biomech. 2021.

Force

Low and continuous.

The SDS spring applies 100 newton, continuously, below the estimated limit for the paediatric spine.

SDS spring, continuous

100 N

Estimated safe limit, paediatric spine

200 to 300 N

Traditional growing rod lengthening, peak

300 to 500 N

Bars are schematic. Safe limit depends on age. Lemans JVC et al. J Biomech. 2021, 124:110571.

Practice set the number

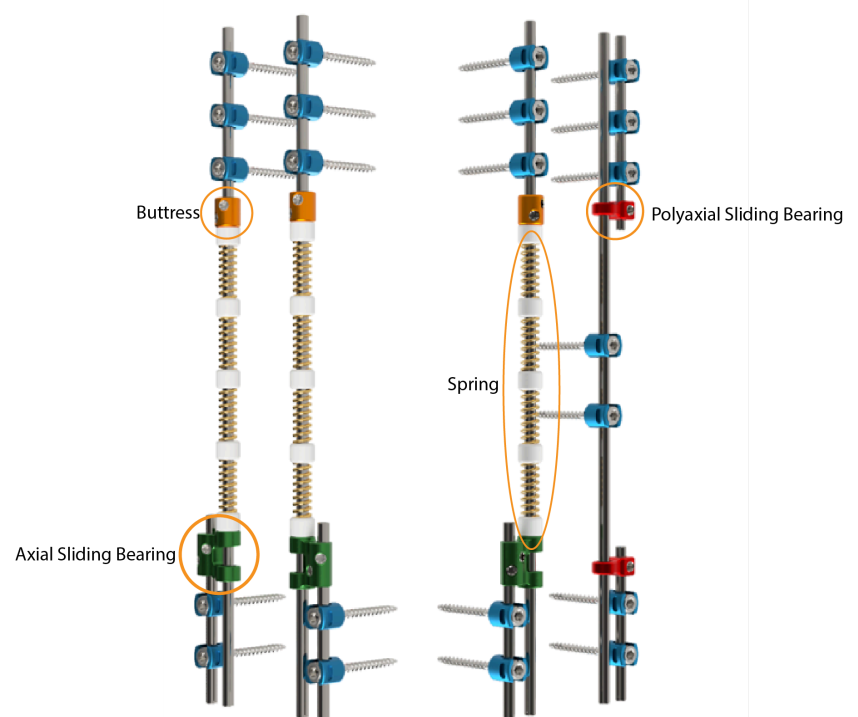
From 75 to 100.

2015

Patient one received a 75 newton spring. For that child it sat on the low side.

Today

100 newton is the working choice in the large majority of cases.



Force is linear with compression. Less compression, less force. So a lower force on the convex side of the curve is an option.

René Castelein at Deformity Down Under, Melbourne, 2026. Image: bilateral (left) and hybrid (right) configurations.

Research set the
range.
Practice set the
number.

100 newton is the best current answer, open to
the next data point.

Sources: Lemans JVC, The power of Springs to treat Scoliosis (PhD thesis). Lemans JVC et al. J Biomech. 2021, 124:110571. Sankar WN et al. Spine. 2011, 36(10):806-809. Cahill PJ et al. Spine. 2010, 35(22):E1199-E1203.

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