



Ideal and Average Values of Cervical Lordosis

The ideal Harrison cervical spine lordotic model is used as a reference guide to calculate a given patient's percent abnormality of the sagittal cervical spine. The Harrison cervical spine model indicates that the cervical lordosis can be approximated with a 63° arc of a circle from C1-T1 and a 42.2° arc of a circle from C2-C7. Clinically, we measure the total angle of cervical spine curvature using lines tangent to the mid-bodies of C2-C7, termed the Absolute Rotation Angle or ARA. While all angles from C2-C7 need to be measured to accurately assess the cervical curvature, it is more efficient to report to the patient one single value that represents their unique spinal **Subluxation**. To calculate the patient's percent abnormality of cervical lordosis, we use three simple steps:

- 1) Take the measured ARA value and divide it by the ideal value,
- 2) Multiply the value obtained above by 100 to get %,
- 3) If the patient's curve is lordotic, then this new value is subtracted from 100% and you have the % abnormality. If the curve is kyphotic then this value is added to 100%.

On the back is a complete table of percent abnormalities for possible ARA values. In the table below, the Harrison Ideal and Average values of cervical lordosis are provided. These values represent the best available evidence and this is an Evidence Based Approach to quantify Subluxation.¹⁻³

References

1. Harrison D, Janik T, Troyanovich S, Holland B. Comparisons of Lordotic Cervical Spine Curvatures to a Theoretical Model of the Sagittal Cervical Spine. *Spine* 1996; 21(6): 667-675.
2. Harrison DD, Harrison DE, Janik TJ, Cailliet R, Haas JW, Ferrantelli J, Holland B. Modeling of the Sagittal Cervical Spine as a Method to Discriminate Hypo-Lordosis: Results of Elliptical and Circular Modeling in 72 Asymptomatic Subjects, 52 Acute Neck Pain Subjects, and 70 Chronic Neck Pain Subjects. *Spine* 2004; 29:2485-2492.
3. McAviney J, Schulz D, Richard Bock R, Harrison DE, Holland B. Determining a clinical normal value for cervical lordosis. *J Manipulative Physiol Ther* 2005;28:187-193.

Table 1

Measurement / Level	Average Value	Ideal Value
Tz (C2 to C7)	15 mm	0 mm
C1-Horizontal (Atlas Plane)	24°	29°
ARA C2-C7	34°	42.2°
RRA C2-C3	7.8°	9.4°
RRA C3-C4	6.6°	8.2°
RRA C4-C5	7.2°	8.2°
RRA C5-C6	5.9°	8.2°
RRA C6-C7	6.6°	8.2°
C7 Posterior Body to Vertical	n/a	21.5°
T1 Posterior Body to Vertical	n/a	26.5°



Kyphotic ARA	% Decreased	Hypo-Lordotic ARA	% Decreased	Hyper-Lordotic ARA	% Increased
0	100.0%	0	100.0%	-43	2.4%
+1	102.4%	-1	97.7%	-44	4.8%
+2	104.8%	-2	95.2%	-45	7.1%
+3	107.1%	-3	92.9%	-46	9.5%
+4	109.5%	-4	90.5%	-47	11.9%
+5	111.9%	-5	88.1%	-48	14.3%
+6	114.3%	-6	85.7%	-49	16.7%
+7	116.7%	-7	83.3%	-50	19.0%
+8	119.0%	-8	81.0%	-51	21.4%
+9	121.4%	-9	78.6%	-52	23.8%
+10	123.8%	-10	76.2%	-53	26.2%
+11	126.2%	-11	73.8%	-54	28.6%
+12	128.6%	-12	71.4%	-55	31.0%
+13	131.0%	-13	69.0%	-56	33.3%
+14	133.3%	-14	66.7%	-57	35.7%
+15	135.7%	-15	64.3%	-58	38.1%
+16	138.1%	-16	61.9%	-59	40.5%
+17	140.5%	-17	59.5%	-60	42.9%
+18	142.9%	-18	57.1%	-61	45.2%
+19	145.2%	-19	54.8%	-62	47.6%
+20	147.6%	-20	52.4%	-63	50.0%
+21	150.0%	-21	50.0%	-64	52.4%
+22	152.4%	-22	47.6%	-65	54.8%
+23	154.8%	-23	45.2%	-66	57.1%
+24	157.1%	-24	42.9%	-67	59.5%
+25	159.5%	-25	40.5%	-68	61.9%
+26	161.9%	-26	38.1%	-69	64.3%
+27	164.3%	-27	35.7%	-70	66.7%
+28	166.7%	-28	33.3%	-71	69.0%
+29	169.0%	-29	31.0%	-72	71.4%
+30	171.4%	-30	28.6%	-73	73.8%
+31	173.8%	-31	26.2%	-74	76.2%
+32	176.2%	-32	23.8%	-75	78.6%
+33	178.6%	-33	21.4%	-76	81.0%
+34	181.0%	-34	19.0%	-77	83.3%
+35	183.3%	-35	16.7%	-78	85.7%
+36	185.7%	-36	14.3%	-79	88.1%
+37	188.1%	-37	11.9%	-80	90.5%
+38	190.5%	-38	9.5%	-81	92.9%
+39	192.9%	-39	7.1%	-82	95.2%
+40	195.2%	-40	4.8%	-83	97.7%
+41	197.7%	-41	2.4%	-84	100.0%
+42	200.0%	-42	0%		