

**Table S1.** Demographic and clinical characteristics of samples involved in this study stratified by vertical skeletal pattern.

| Level                         | Overall    | Normodivergent | Hyperdivergent | Hypodivergent | P-value |
|-------------------------------|------------|----------------|----------------|---------------|---------|
| <b>N</b>                      | 2079       | 1314           | 239            | 526           |         |
| <b>Age (%)</b>                |            |                |                |               |         |
| Adolescent                    | 734(35.3)  | 498(37.9)      | 70(29.3)       | 166(31.6)     | 0.008   |
| Young adult                   | 1272(61.2) | 765(58.2)      | 162(67.8)      | 345(65.6)     |         |
| Middle age                    | 73(3.5)    | 51(3.9)        | 7(2.9)         | 15(2.9)       |         |
| <b>Gender (%)</b>             |            |                |                |               |         |
| Male                          | 623(30.0)  | 378(28.8)      | 31(13.0)       | 214(40.7)     | <0.001  |
| Female                        | 1456(70.0) | 936(71.2)      | 208(87.0)      | 312(59.3)     |         |
| <b>Molar Relationship (%)</b> |            |                |                |               |         |
| I                             | 654(31.5)  | 445(33.9)      | 71(29.7)       | 138(26.2)     | <0.001  |
| II-1                          | 654(31.5)  | 401(30.5)      | 60(25.1)       | 193(36.7)     |         |
| II-2                          | 205(9.9)   | 123(9.4)       | 41(17.2)       | 41(7.8)       |         |
| III                           | 506(24.3)  | 307(23.4)      | 58(24.3)       | 141(26.8)     |         |
| IV                            | 60(2.9)    | 38(2.9)        | 9(3.8)         | 13(2.5)       |         |
| <b>Upper crowding (%)</b>     |            |                |                |               |         |
| I                             | 1275(61.3) | 782(59.5)      | 143(59.8)      | 350(66.5)     | 0.061   |
| II                            | 507(24.4)  | 335(25.5)      | 57(23.8)       | 115(21.9)     |         |
| III                           | 297(14.3)  | 197(15.0)      | 39(16.3)       | 61(11.6)      |         |
| <b>Lower crowding (%)</b>     |            |                |                |               |         |
| I                             | 1325(63.7) | 816(62.1)      | 143(59.8)      | 366(69.6)     | 0.013   |
| II                            | 557(26.8)  | 366(27.9)      | 67(28.0)       | 124(23.6)     |         |
| III                           | 197(9.5)   | 132(10.0)      | 29(12.1)       | 36(6.8)       |         |
| <b>Overbite (%)</b>           |            |                |                |               |         |
| Normal                        | 1302(62.6) | 847(64.5)      | 122(51.0)      | 333(63.3)     | <0.001  |
| Deep                          | 246(11.8)  | 114(8.7)       | 13(5.4)        | 119(22.6)     |         |
| Open                          | 117(5.6)   | 66(5.0)        | 44(18.4)       | 7(1.3)        |         |

|   |              |              |              |              |        |
|---|--------------|--------------|--------------|--------------|--------|
| Shallow   | 414(19.9)    | 287(21.8)    | 60(25.1)     | 67(12.7)     |        |
| <b>Overjet (%)</b>                                |              |              |              |              |        |
| Normal  | 1125(54.1)   | 739(56.2)    | 126(52.7)    | 260(49.4)    | <0.001 |
| Cross   | 234(11.3)    | 117(8.9)     | 28(11.7)     | 89(16.9)     |        |
| Deep  | 690(33.2)    | 437(33.3)    | 81(33.9)     | 172(32.7)    |        |
| Shallow   | 30(1.4)      | 21(1.6)      | 4(1.7)       | 5(1.0)       |        |
| <b>Sagittal skeletal pattern (%)</b>              |              |              |              |              |        |
| I   | 968(46.6)    | 636(48.4)    | 84(35.1)     | 248(47.1)    | <0.001 |
| II  | 691(33.2)    | 454(34.6)    | 128(53.6)    | 109(20.7)    |        |
| III   | 420(20.2)    | 224(17.0)    | 27(11.3)     | 169(32.1)    |        |
| <b>U1-ANS (mm) (mean (SD))</b>                    | 27.60(3.08)  | 27.89(2.90)  | 29.45(2.67)  | 26.05(3.04)  | <0.001 |
| <b>U1-OP (mean (SD))</b>                          | 54.09(7.65)  | 53.61(7.35)  | 52.89(6.63)  | 55.81(8.52)  | <0.001 |
| <b>U1-PP (mm) (mean (SD))</b>                     | 27.28(3.12)  | 27.56(2.94)  | 29.21(2.69)  | 25.69(3.06)  | <0.001 |
| <b>U1-NA (mean (SD))</b>                          | 27.92(8.76)  | 27.80(8.47)  | 25.47(7.99)  | 29.36(9.51)  | <0.001 |
| <b>U1-NA (mm) (mean (SD))</b>                     | 5.65(2.85)   | 5.70(2.82)   | 5.31(2.67)   | 5.68(2.99)   | 0.152  |
| <b>U1-SN (mean (SD))</b>                          | 108.46(9.48) | 108.10(9.04) | 103.11(8.07) | 111.78(9.88) | <0.001 |
| <b>U1-PP (mean (SD))</b>                          | 119.54(8.88) | 119.40(8.59) | 116.90(7.86) | 121.07(9.71) | <0.001 |
| <b>U1-NPo (mm) (mean (SD))</b>                    | 9.86(4.92)   | 10.31(4.62)  | 12.64(5.44)  | 7.48(4.39)   | <0.001 |
| <b>UL-EP (mm) (mean (SD))</b>                     | 0.53(2.85)   | 0.73(2.76)   | 1.41(2.99)   | -0.38(2.81)  | <0.001 |
| <b>Upper lip to S line (mean (SD))</b>            | 4.60(2.64)   | 4.55(2.53)   | 3.92(2.86)   | 5.04(2.74)   | <0.001 |
| <b>Upper Lip Length (ULL) (mm) (mean (SD))</b>    | 21.46(2.40)  | 21.55(2.31)  | 22.43(2.23)  | 20.78(2.51)  | <0.001 |
| <b>Basic upper lip thickness (mm) (mean (SD))</b> | 14.48(1.97)  | 14.40(1.95)  | 14.33(1.90)  | 14.74(2.02)  | 0.002  |
| <b>Nasolabial A (mean (SD))</b>                   | 95.74(11.83) | 96.48(11.52) | 97.57(11.50) | 93.05(12.32) | <0.001 |
| <b>Upper lip thickness (mm) (mean (SD))</b>       | 14.85(2.50)  | 14.80(2.44)  | 14.80(2.49)  | 14.99(2.65)  | 0.329  |
| <b>Superior sulcus depth (mm) (mean (SD))</b>     | 4.84(2.17)   | 4.75(2.12)   | 4.34(2.17)   | 5.28(2.23)   | <0.001 |