Supplementary file 1

Study or Subgroup	After Mean	SD	Total	Before Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
4.2.1 Miniplate								
Elshal 2021	23.25	1.48	10	27.1	1.29	10	13.3%	-3.85 [-5.07, -2.63]
Erverdi 2004	23.8	2.74	10	26.4	1.64	10	5.0%	-2.60 [-4.58, -0.62]
Erverdi 2007	19	2.3	11	22.6	3.21	11	3.6%	-3.60 [-5.93, -1.27]
Marzouk 2015	25.5	2.01	13	28.6	2.32	13	7.1%	-3.10 [-4.77, -1.43]
Marzouk 2016	25.23	2.14	26	28.27	2.55	26	12.1%	-3.04 [-4.32, -1.76]
Marzouk 2018	25.27	2.23	28	28.31	2.48	28	12.9%	-3.04 [-4.28, -1.80]
Turkkahraman 2016	23.59	1.73	20	27.18	3.15	20	8.0%	-3.59 [-5.17, -2.01]
Subtotal (95% CI)			118			118	62.1%	-3.29 [-3.85, -2.72]
Heterogeneity: Tau² = 0.00; Chi² = 1.84, df = 6 (P = 0.93); I² = 0%								
Test for overall effect: Z = 11.43 (P < 0.00001)								
4.2.2 Miniscrew								
Akl 2020	21.24	1.81	11	23.5	2.56	11	5.8%	-2.26 [-4.11, -0.41]
Kim 2018	24.2	1.8	21	26.4	1.8	21	16.7%	-2.20 [-3.29, -1.11]
Kuroda 2007	26.4	2.4	10	28.7	2.8	10	3.8%	-2.30 [-4.59, -0.01]
Scheffler 2014	23.2	2.8	30	25.5	2.3	30	11.7%	-2.30 [-3.60, -1.00]
Subtotal (95% CI)			72			72	37.9%	-2.25 [-2.97, -1.53]
Heterogeneity: Tau² = 0.00; Chi² = 0.02, df = 3 (P = 1.00); I² = 0%								
Test for overall effect: Z = 6.11 (P < 0.00001)								
Total (95% CI)			190			190	100.0%	-2.89 [-3.34, -2.45]
Heterogeneity: Tau² = 0.00; Chi² = 6.80, df = 10 (P = 0.74); I² = 0%								
Test for overall effect: Z = 12.77 (P < 0.00001)								
Test for subgroup differences: Chi² = 4.94, df = 1 (P = 0.03), I² = 79.8%								

Higher Before   Higher After

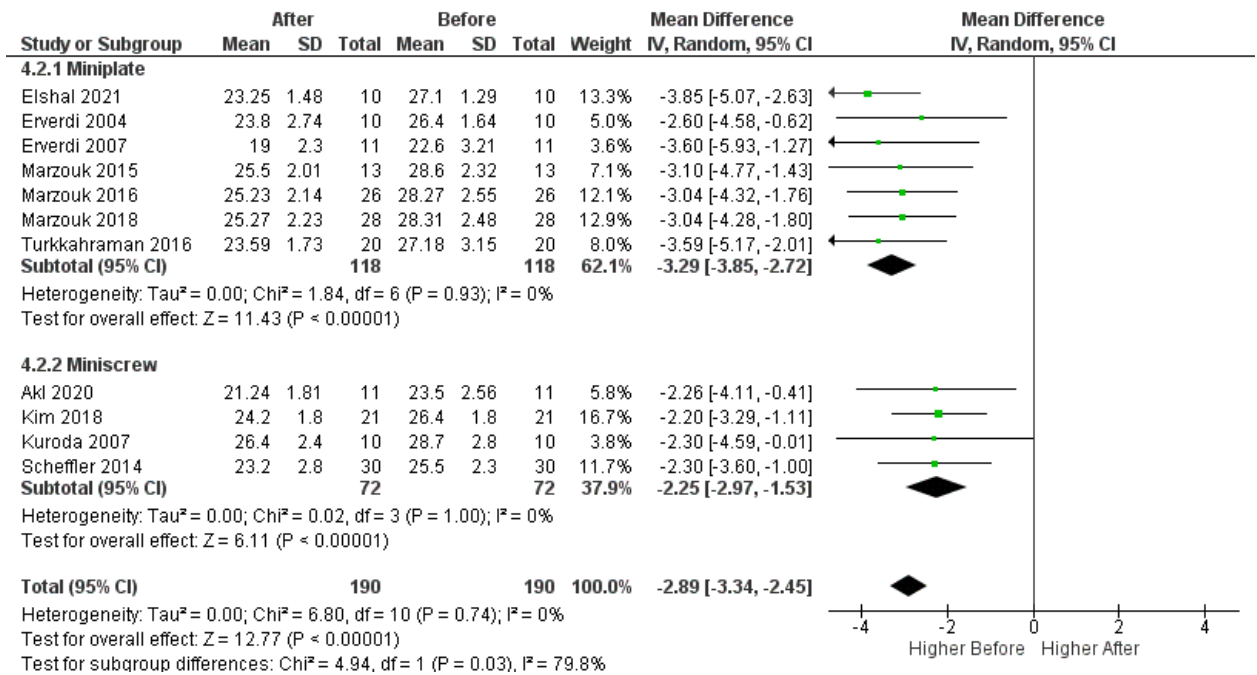**Figure S1: Forrest plot of subgroup analysis of differences in U6-PP according to the type of anchorage used.**

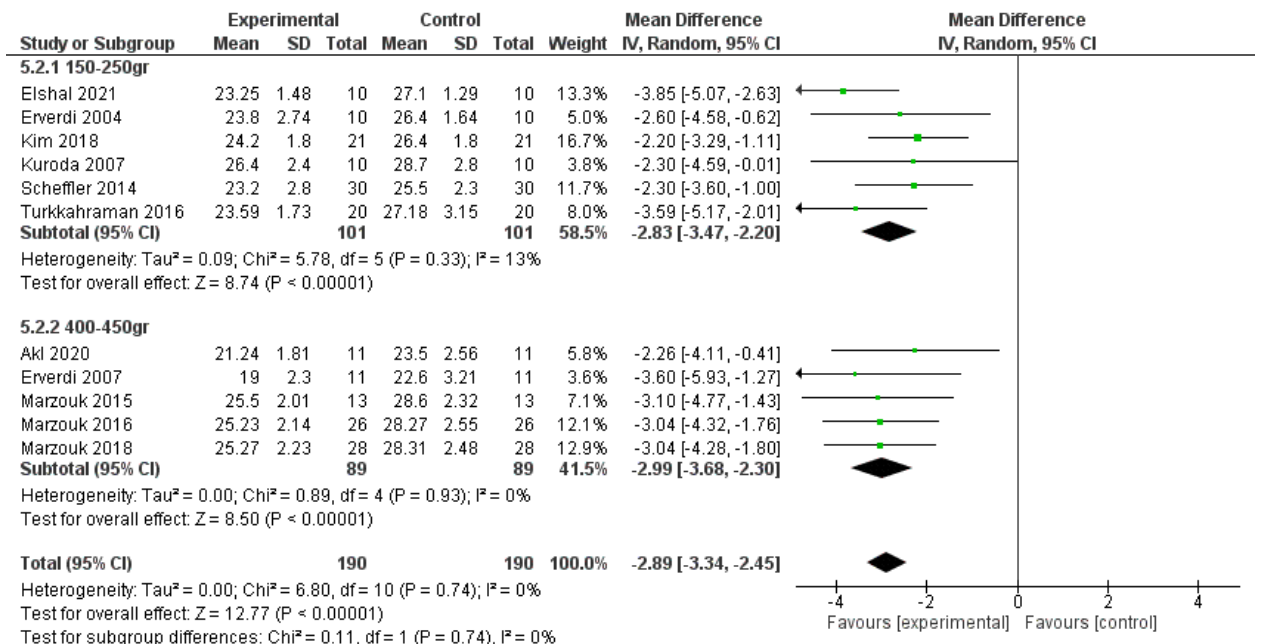| Study or Subgroup	Experimental			Control			Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI
	Mean	SD	Total	Mean	SD	Total			
5.2.1 150-250gr									
Elshal 2021	23.25	1.48	10	27.1	1.29	10	13.3%	-3.85 [-5.07, -2.63]	
Erverdi 2004	23.8	2.74	10	26.4	1.64	10	5.0%	-2.60 [-4.58, -0.62]	
Kim 2018	24.2	1.8	21	26.4	1.8	21	16.7%	-2.20 [-3.29, -1.11]	
Kuroda 2007	26.4	2.4	10	28.7	2.8	10	3.8%	-2.30 [-4.59, -0.01]	
Scheffler 2014	23.2	2.8	30	25.5	2.3	30	11.7%	-2.30 [-3.60, -1.00]	
Turkkahraman 2016	23.59	1.73	20	27.18	3.15	20	8.0%	-3.59 [-5.17, -2.01]	
Subtotal (95% CI)			**101**			**101**	**58.5%**	**-2.83 [-3.47, -2.20]**	
Heterogeneity: Tau² = 0.09; Chi² = 5.78, df = 5 (P = 0.33); I² = 13%									
Test for overall effect: Z = 8.74 (P < 0.00001)									
5.2.2 400-450gr									
Akl 2020	21.24	1.81	11	23.5	2.56	11	5.8%	-2.26 [-4.11, -0.41]	
Erverdi 2007	19	2.3	11	22.6	3.21	11	3.6%	-3.60 [-5.93, -1.27]	
Marzouk 2015	25.5	2.01	13	28.6	2.32	13	7.1%	-3.10 [-4.77, -1.43]	
Marzouk 2016	25.23	2.14	26	28.27	2.55	26	12.1%	-3.04 [-4.32, -1.76]	
Marzouk 2018	25.27	2.23	28	28.31	2.48	28	12.9%	-3.04 [-4.28, -1.80]	
Subtotal (95% CI)			**89**			**89**	**41.5%**	**-2.99 [-3.68, -2.30]**	
Heterogeneity: Tau² = 0.00; Chi² = 0.89, df = 4 (P = 0.93); I² = 0%									
Test for overall effect: Z = 8.50 (P < 0.00001)									
Total (95% CI)			**190**			**190**	**100.0%**	**-2.89 [-3.34, -2.45]**	
Heterogeneity: Tau² = 0.00; Chi² = 6.80, df = 10 (P = 0.74); I² = 0%									
Test for overall effect: Z = 12.77 (P < 0.00001)									
Test for subgroup differences: Chi² = 0.11, df = 1 (P = 0.74), I² = 0%									

Favours [experimental]   Favours [control]

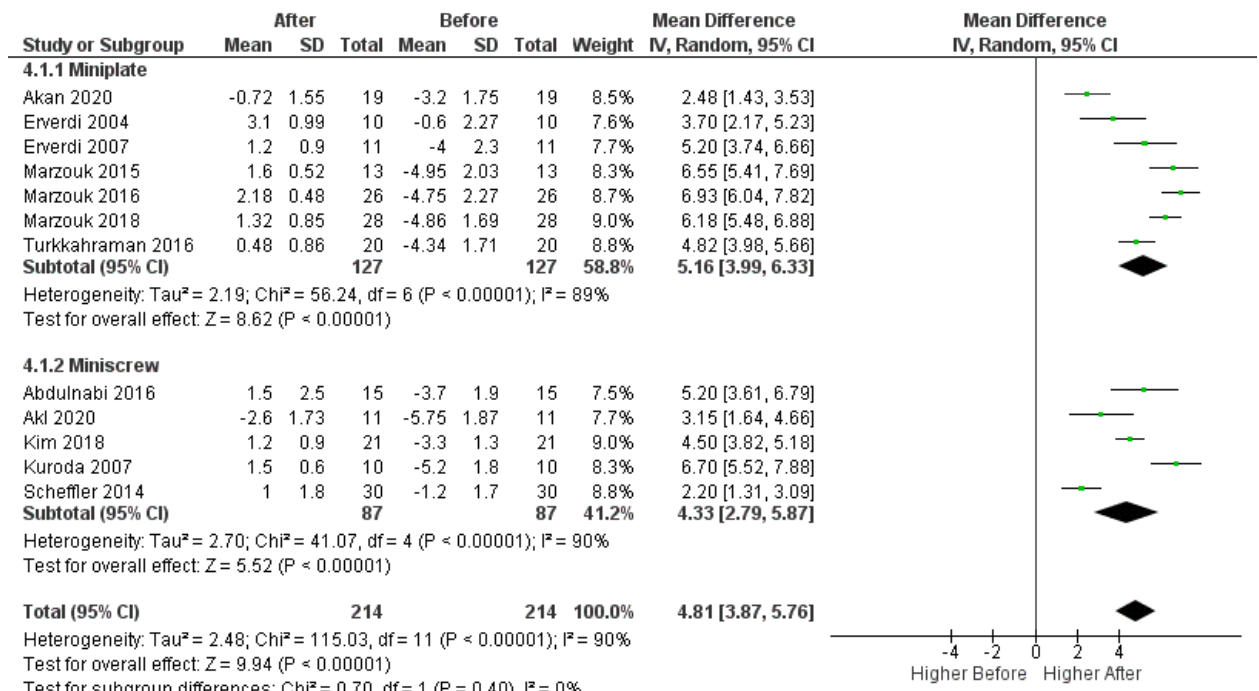**Figure S2: Forrest plot of subgroup analysis of differences in U6-PP according to the amount of applied force.**

Study or Subgroup	After Mean	SD	Total	Before Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI
4.1.1 Miniplate									
Akan 2020	-0.72	1.55	19	-3.2	1.75	19	8.5%	2.48 [1.43, 3.53]	
Erverdi 2004	3.1	0.99	10	-0.6	2.27	10	7.6%	3.70 [2.17, 5.23]	
Erverdi 2007	1.2	0.9	11	-4	2.3	11	7.7%	5.20 [3.74, 6.66]	
Marzouk 2015	1.6	0.52	13	-4.95	2.03	13	8.3%	6.55 [5.41, 7.69]	
Marzouk 2016	2.18	0.48	26	-4.75	2.27	26	8.7%	6.93 [6.04, 7.82]	
Marzouk 2018	1.32	0.85	28	-4.86	1.69	28	9.0%	6.18 [5.48, 6.88]	
Turkkahraman 2016	0.48	0.86	20	-4.34	1.71	20	8.8%	4.82 [3.98, 5.66]	
Subtotal (95% CI)			127			127	58.8%	5.16 [3.99, 6.33]	
Heterogeneity: Tau² = 2.19; Chi² = 56.24, df = 6 (P < 0.00001); I² = 89%									
Test for overall effect: Z = 8.62 (P < 0.00001)									
4.1.2 Miniscrew									
Abdulnabi 2016	1.5	2.5	15	-3.7	1.9	15	7.5%	5.20 [3.61, 6.79]	
Akl 2020	-2.6	1.73	11	-5.75	1.87	11	7.7%	3.15 [1.64, 4.66]	
Kim 2018	1.2	0.9	21	-3.3	1.3	21	9.0%	4.50 [3.82, 5.18]	
Kuroda 2007	1.5	0.6	10	-5.2	1.8	10	8.3%	6.70 [5.52, 7.88]	
Scheffler 2014	1	1.8	30	-1.2	1.7	30	8.8%	2.20 [1.31, 3.09]	
Subtotal (95% CI)			87			87	41.2%	4.33 [2.79, 5.87]	
Heterogeneity: Tau² = 2.70; Chi² = 41.07, df = 4 (P < 0.00001); I² = 90%									
Test for overall effect: Z = 5.52 (P < 0.00001)									
Total (95% CI)			214			214	100.0%	4.81 [3.87, 5.76]	
Heterogeneity: Tau² = 2.48; Chi² = 115.03, df = 11 (P < 0.00001); I² = 90%									
Test for overall effect: Z = 9.94 (P < 0.00001)									
Test for subgroup differences: Chi² = 0.70, df = 1 (P = 0.40), I² = 0%									

Higher Before — Higher After

Figure S3: Forrest plot of subgroup analysis of differences of overbite according to the type of anchorage used.

Study or Subgroup	Experimental Mean	SD	Total	Control Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI
5.1.1 150-250gr									
Abdulnabi 2016	1.5	2.5	15	-3.7	1.9	15	7.5%	5.20 [3.61, 6.79]	
Erverdi 2004	3.1	0.99	10	-0.6	2.27	10	7.6%	3.70 [2.17, 5.23]	
Kim 2018	1.2	0.9	21	-3.3	1.3	21	9.0%	4.50 [3.82, 5.18]	
Kuroda 2007	1.5	0.6	10	-5.2	1.8	10	8.3%	6.70 [5.52, 7.88]	
Scheffler 2014	1	1.8	30	-1.2	1.7	30	8.8%	2.20 [1.31, 3.09]	
Turkkahraman 2016	0.48	0.86	20	-4.34	1.71	20	8.8%	4.82 [3.98, 5.66]	
Subtotal (95% CI)			106			106	50.0%	4.50 [3.30, 5.69]	
Heterogeneity: Tau² = 1.89; Chi² = 41.15, df = 5 (P < 0.00001); I² = 88%									
Test for overall effect: Z = 7.38 (P < 0.00001)									
5.1.2 400-450gr									
Akan 2020	-0.72	1.55	19	-3.2	1.75	19	8.5%	2.48 [1.43, 3.53]	
Akl 2020	-2.6	1.73	11	-5.75	1.87	11	7.7%	3.15 [1.64, 4.66]	
Erverdi 2007	1.2	0.9	11	-4	2.3	11	7.7%	5.20 [3.74, 6.66]	
Marzouk 2015	1.6	0.52	13	-4.95	2.03	13	8.3%	6.55 [5.41, 7.69]	
Marzouk 2016	2.18	0.48	26	-4.75	2.27	26	8.7%	6.93 [6.04, 7.82]	
Marzouk 2018	1.32	0.85	28	-4.86	1.69	28	9.0%	6.18 [5.48, 6.88]	
Subtotal (95% CI)			108			108	50.0%	5.12 [3.66, 6.58]	
Heterogeneity: Tau² = 3.00; Chi² = 57.99, df = 5 (P < 0.00001); I² = 91%									
Test for overall effect: Z = 6.86 (P < 0.00001)									
Total (95% CI)			214			214	100.0%	4.81 [3.87, 5.76]	
Heterogeneity: Tau² = 2.48; Chi² = 115.03, df = 11 (P < 0.00001); I² = 90%									
Test for overall effect: Z = 9.94 (P < 0.00001)									
Test for subgroup differences: Chi² = 0.42, df = 1 (P = 0.52), I² = 0%									

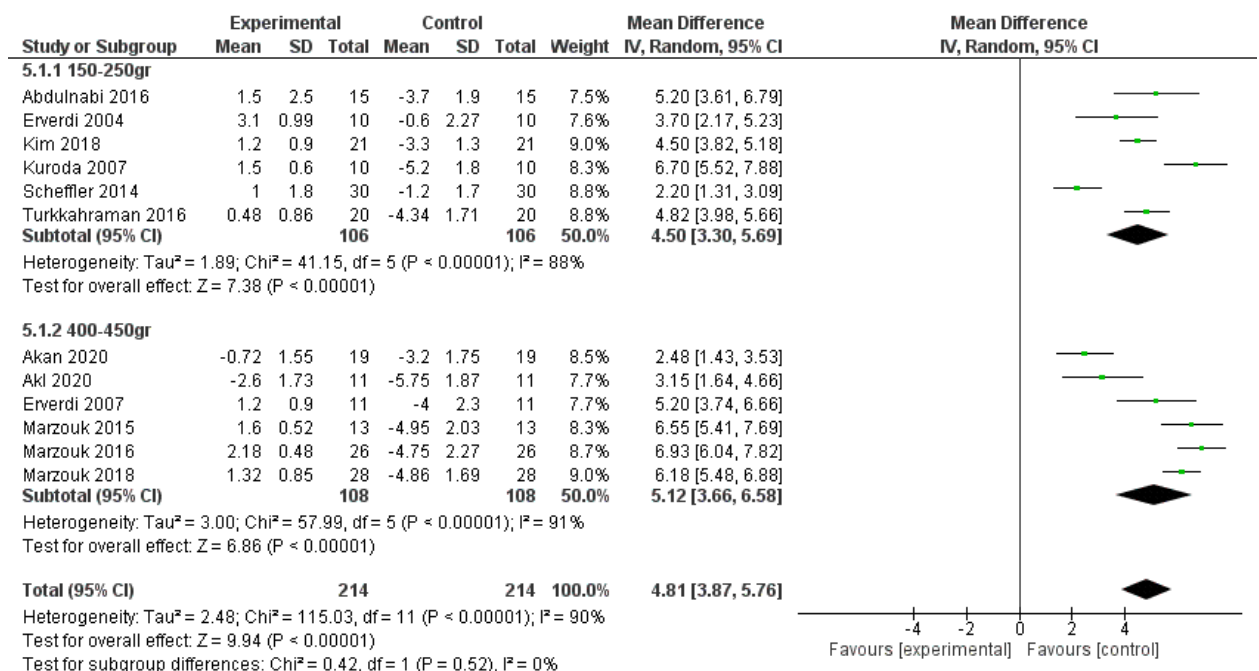Favours [experimental] — Favours [control]

Figure S4: Forrest plot of subgroup analysis of differences of overbite according to the amount of applied force.
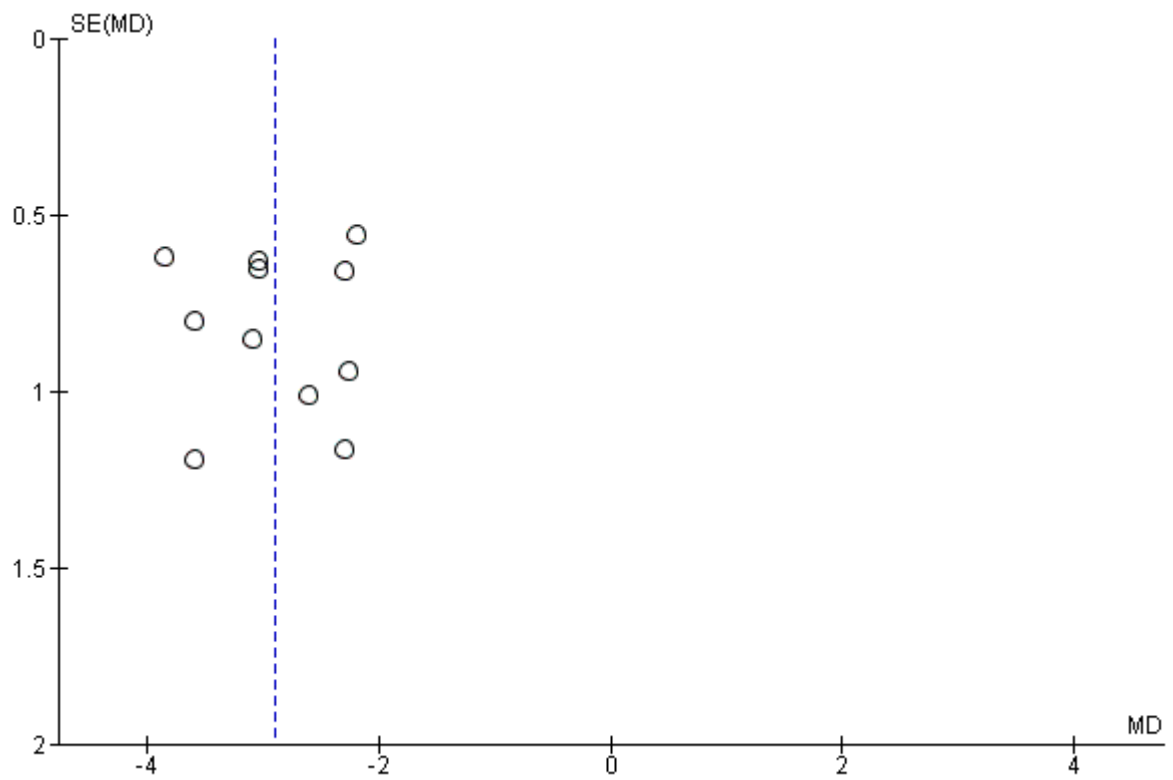

Figure S5: The Funnel plot of U6-PP changes to check publication bias.