

Table S1. Characteristics of selected studies.

Study	Study subjects			Treatment
	Total	Age	Gender: F/M	
Kravitz et al., 2009	37 patients	mean age: 31 years	23 Female, 13 Male	Invisalign 10 aligner maxilla 12 aligner mandible
Simon et al;2014	30 patients	-	Female-19 Male -11	Invisalign treatment With and Without attachment, power ridge and no auxillaries.
Haouili et al 2020	38 patients	Mean age 36 years	25 female 13 male	Invisalign Both arch with averaged 6 attachments and less than 1 mm IPR
Lione et al; 2022	40 patients	Adult	Female20 Male 20	Invisalign patients with class II molar relationship. Maxillary first molar with an >11°
Karras et al; 2020	100 patients 382 teeth	Mean age 28 years 2 months.	68 female 32 Male	Invisalign With Optimised rotation attachment Vs conventional attachment AND Optimised extrusion attachment Vs conventional extrusion attachment.
Castroflorio et al; 2023	79 patients	Mean age 30.8 years	Male 23 Female 56	Invisalign
Krieger et al 2012	50 patients	Mean age: 33+- 11.9y	Female 34 Male 16	Invisalign Low to moderate Maxillary and /or Mandibular crowding
Khosravi et al., 2017	120 patients	Mean age 33 years	-	Cephalometric evaluation of overbite correction
Duncan et al; 2015	61 adult patients With lower dentition crowding	Non growing adult	Female 44 Male 17	Invisalign Non extraction with or without IPR
Houle et al 2017	64 white patients	Mean age 31.2 years	Female 41 Male 23	Invisalign
Morales-Burruezo et al 2020	114 patients	Age 18-75 years	-	Invisalign Maxillary expansion with smart Track aligner
Zhou and GUO et al 2020	20 Chinese patients	Age 20-45 years	Female 15 Male 5	Invisalign
Lione et al; 2021	28 patients(European ancestry)	Mean age 31.9+-5.4 years)	Female 16 Male 12	Invisalign patients with class II molar relationship. Maxillary first molar with an >11°
Ravera et al;2016	20 patients	Average age 29.73 years.	Female 11 Male 9	Invisalign
Palone et al; 2022	150 patients	Mean age 33.7+-12.7years	Female 80 Male 70	F 22 aligners

Table S2: Rotation with Clear Aligners:

Author, Year	Analyzed teeth	Measurement	Pre-treatment (mean ± SD)	Post-treatment (mean ± SD)	Difference (post – pre)	Mean accuracy± SD	p-value
Lione et al., 2022	Upper first molar	Henry's angle (H°) >11°	18.43 ± 4.91	11.06 ± 3.16	-7,37		<0.001
Kravitz et al., 2009	Max canine	(<15°)					P<0.05
	Mand canine	(<15°)					P<0.05
	Max canine	(>15°)					P<0.05
	Mand canine	(>15°)					P<0.05
Simon et al., 2014	premolar	(<15°)				43.3% ± 0.24	P<0.05
		(>15°)				23.6%± 0.15	P<0.05
	right 1 st molar		104.8 ±4.43	107.0 ±3.85	2.22 ±4.37		<0.001
	left 1 st molar		107.7 ±4.62	110.2 ±4.32	2.46 ±3.75		<0.001

Morales-Burruezo et al 2020	Left 1st molar.	No cross-bite group	107.0 ±3.23	108.82 ±3.20	1.82 ±4.14		0.386
	right 1st molar	Cross bite group	103.06 ±4.50	105.60 ±3.74	2.54 ±4.55		
	Left 1st molar	No cross-bite group	111.25 ±3.33	112.98 ±2.93	1.73 ±3.58		0,042
		Cross bite group	104.76 ±3.29	108.00 ±3.98	3.24±4.15		0,042

Table S3: Accuracy of rotation. mPM = prescribed movements; mLC = lack of correction

Author, Year	Analyzed teeth	Post-treatment (mean ± SD)	Planned treatment (mean ± SD)	Difference (post – planned)	p-value	mPM (°)	mLC (°)	p-value	Accuracy
Lione et al., 2022	Upper first molars	11.06 ± 3.16	9.05 ± 2.41	2.01	<0.001				82 %
Simon et al., 2014	Upper premolars (<15°)								43,30 %
	Upper premolars (>15°)								23,60 %
Castroflorio et al; 2023	Max central					7.33 ± 6.03	2.77 ± 2.27	P<0.001	
	Max lateral					10.37 ±6.71	3.91± 2.94	P<0.001	
	Max canine					11.17 ± 7.98	4.66 ± 3.41	P<0.001	
	Max premolars					5.52 ± 3.33	2.20± 1.41	P<0.001	
	Max 1 st molars					4.42 ± 3.72	1.47 ± 1.21	P = 0.3613	
	Max 2 nd molars					2.64 ± 3.25	1.71 ± 1.52	P = 0.0527	
	Mand incisors					9.18 ± 4.71	2.60 ± 1.90	P<0.001	
	Mand canine					14.83± 9.38	4.80 ± 3.70	P<0.001	
	Mand premolars					8.24 ± 4.18	3.84 ± 2.38	P<0.001	
	Mand 1 st molars					3.08 ± 3.16	1.99 ± 1.57	P<0.001	
	Mand 2 nd molars					2.87 ± 3.33	2.28 ± 2.06	P<0.001	
Kravitz et al., 2009	Max central incisors							P<0.001	54,20 %
	Max lateral incisors							P<0.001	43,40 %
	Max canine							P<0.001	32,20 %
	Mand central							P<0.001	48,80 %
	Mand lateral							P<0.001	51,60 %
	Mand canine							P<0.001	29,10 %
Haouili et al 2020									Mesial rotation(maxilla)Distal rotation(maxilla)
	Max central incisors							P<0.05	61,10 % 54,80 %
	Max lateral incisors							P<0.05	54,60 % 48,70 %
	Max canine							P<0.05	51,50 % 37,20 %
	1 st premolar							P<0.05	50,90 % 50,00 %
	2nd premolar							P<0.05	39,20 % 44,70 %
	First molar							P<0.05	42,90 % 43,20 %
	Second molar							P<0.05	42,50 % 40,70 %
								P<0.05	Mesial rotation(mandible)Distal rotation(mandible))
	Mandcentral incisors							P<0.05	51,30 % 43,10 %
	Mand lateral incisors							P<0.05	52,60 % 41,85
	Mand canine							P<0.05	55,20 % 45,80 %
	1 st premolar							P<0.05	43,10 % 47,90 %
	2nd premolar							P<0.05	44,80 % 49,80 %
	First molar							P<0.05	27,80 % 35,40 %
Morales-Burruezo et al 2020	Right 1 st molar	107.0±3.85	107.6±3.86	0.54±3.05				P=0.059	80,40 %
	Left 1 st molar	110.2±4.32	109.9±4.59	-0.34±3.57				P=0.309	115,30 %

Table S4: Accuracy of rotation. SD = standard deviation

Author, Year	Movement	Staging/overcorrection	Auxillaries	Mean accuracy (mean ± SD)	p-value
Simon et al., 2014	Premolar derotation >10°		With attachments	37,50 %	<0.001
	Premolar derotation >10°		Without attachments	42,40 %	0,02
		Premolar derotation >1.5°		23.2±0.2	
		Premolar derotation <1.5°		41.8±0.3	
Castroflorio et al; 2023			Conventional attachments		0,09
			Optimized attachments		0,03
		Frequency of Aligner Change (7/10 days)		Predictability decrease 12%	0,23
		Frequency of Aligner Change (14days)			0,03
		Frequency of Aligner Change (Constant)			<0.001
Karras et al., 2020	Canine and premolar Rotation		Optimized /conventional attachment	(conventional -optimized) 1.61'±6.11	0,0638
				(optimized – conventional) 7.3±26.4	0,0533
Kravitz et al., 2009	Max canine (<15°)			35,80 %	P<0.05
	Mand canine (<15°)			27,90 %	P<0.05
	Max canine (>15°)			18,80 %	P<0.05
	Mand canine (>15°)			33,20 %	P<0.05
Haouli et al 2020	Distal rotation of Max canine		IPR<1mm / Attachments	37 %	P<0.05
Palone et al; 2022	Mesial rotation of Max canine			52 %	P<0.05
	Premolar and molar ≤6.7	0.38			P<0.001
	Premolar and molar ≥6.7	1.02			P<0.001
	Incisors and canine ≤8.1	2			P<0.001
	Incisors and canine 8.1-10.3	2.67			P<0.013
	Incisors and canine 10.3-17.5	3.52			P<0.001
	Lower incisors, upper canine, premolar 17.5 ±26	4.15			P=0.032
	Lower incisors, upper canine, premolar 17.5 ±26	6.93			P=0.032
	Upper incisors, lower canine >26	6.96			P<0.001

Table S5: Expansion with clear aligners:

Author, Year	Analyzed teeth	Measurement	Pre-treatment (mean ± SD)	Post-treatment (mean ± SD)	Difference (post – pre)	p-value
Lione et al., 2022	Upper first molar	Mesial buccal Expansion(ME)	25.6 ± 3.50	30.62 ± 6.20	2,2	<0.001
	Upper first molar	Distal buccal Expansion(DE)	27.6 ± 4.6	33.51 ± 6.10	1,5	<0.001
	Canine		31.38±2.61	33.25±2.03	1.87±1.78	<0.001
	1 st premolar		37.48±3.04	40.62±2.46	3.14±2.25	<0.001
	2 nd premolar		42.44±3.49	45.89±2.84	3.45±2.09	<0.001
	1 st Molar		47.12±3.64	49.69±3.08	2.57±1.83	<0.001
	2 nd Molar		55.40±3.84	55.85±3.77	0.45±1.83	<0.001

	Canine	No cross-bite group	31.83±2.30	33.37±1.99	1.54±1.52	0,076
		Cross-bite group	31.02±2.81	33.15±2.08	2.13±1.93	0,076
	1 st pre molar	No cross-bite group	38.85±2.67	40.67±2.30	2.82±1.67	0,173
		Cross bite group	37.18±3.30	40.58±2.53	3.40±2.62	0,173
	2 nd pre molar	No cross-bite group	42.69±2.98	45.81±2.64	3.12±1.64	0,132
		Cross bite group	42.24±3.87	45.95±3.02	3.71±2.37	0,132
	1 st molar	No cross-bite group	47.08±3.28	49.37±2.89	2.29±1.53	0,154
		Cross bite group	47.15±3.93	49.94±3.22	2.79±2.02	0,154
	2 nd molar	No cross-bite group	55.28±3.57	55.79±3.53	0.51±1.22	0,731
		Cross bite group	55.51±4.06	55.90±3.98	0.39±2.22	0,731
Duncan et al; 2015	Canine	Mild crowding	25,567	25,854	-1,2868	0,0002
	Premolar	Mild crowding	26,456	28,031	-1,5752	0,0002
	Molar	Mild crowding	32,577	34,231	-1,6537	<0.0001
	Canine	Moderate crowding	23,556	25,331	-1,7742	0,0001
	Premolar	Moderate crowding	24,943	27,465	-2,5223	<0.0001
	Molar	Moderate crowding	32,741	34,606	-1,8653	<0.0001
	Canine	Severe crowding	24,077	25,816	-1,7391	0,0003
	Premolar	Severe crowding	24,973	28,168	-3,1952	<0.0001
	Molar	Severe crowding	31,334	33,986	-2,6526	<0.0001
	Linear measurements, mm					
Lione et al; 2021	Inter canine width	3-Mar	31.4±2.8	33.6±2.2	2,2	<0.001
	First inter Premolar width	4-Apr	37.7±3.3	41.3±2.6	3,5	<0.001
	2 nd inter premolar width	5-May	43.2±3.2	47.1±3.0	3,8	<0.001
	First intermolar width	6-6 mesial cusp	49.7±3.8	52.3±3.5	2,6	<0.001
	First intermolar width	6-6 distal cusp	51.6±3.7	53.8±3.7	2,2	<0.001
	First intermolar width	6-6 transpalatal	33.6±2.6	35.2±2.9	1,6	<0.001
	Second intermolar width	7-7 mesial cusp	57.2±3.8	57.9±3.9	0,7	NS
	Second intermolar width	7-7 distal cusp	58.1±4.5	58.4±4.7	0,3	NS
	second intermolar width	7-7 transpalatal	39.4±3.5	39.7±3.9	0,5	NS
	Angular measurements					
	13 crown angulation		7.6±2.7	3.1±1.2	4,5	<0.001
	14 crown angulation		10.3±4.4	4.5±2.9	5,8	<0.001
	15 crown angulation		6.4±3.6	0.4±1.1	6	<0.001
	16 crown angulation		10.2±2.5	6.9±2.8	3,3	<0.01
	17 crown angulation		1.0±1.6	-0.6±1.8	1,6	NS
	23 crown angulation		3.8±1.5	0.3±1.2	3,5	<0.01
	24 crown angulation		8.2±4.5	1.4±0.8	6,8	<0.05
	25 crown angulation		6.1±2.9	0.9±1.1	5,2	<0.01
	26 crown angulation		9.5±2.7	4.8±1.9	4,7	<0.001
	27 crown angulation		3.6±1.3	0.5±0.2	3,1	NS

Table S6: Accuracy of expansion: mPM = prescribed movements; mLC = lack of correction:

Author, Year	Analyzed teeth	measurement	Post-treatment (mean ± SD)	Planned treatment (mean ± SD)	Difference (post – planned)	p-value	mPM (°)	mLC (°)	CI (confidence interval)	Accuracy
Lione et al., 2022	Upper first molars	Mesial buccal Expansion (ME)	30.62 ± 6.20	30.71 ± 0.7	0,1	>0.5				99 %
	Upper first molars	Distal buccal Expansion (DE)	33.51 ± 6.10	33.4 ± 0.8	0,11	>0.5				99 %
Morales-Burruezo et al 2020	Canine		33.25±2.03	33.88±2.06	0.63±0.75	P<0.001				74,80 %
	1 st premolar		40.62±2.46	41.39±2.46	0.77±1.44	P<0.001				80,30 %
	2 nd premolar		45.89±2.84	46.70±2.81	0.81±1.26	P<0.001				81 %
	1 st Molar		49.69±3.08	50.38±3.02	0.69±1.21	P<0.001				79,10 %
	2 nd Molar		55.85±3.77	56.10±3.56	0.25±1.97	0,183				65,20 %
	Canine		1.44 ±0.60	1.78±0.63	0.33±0.26	0,009				79.25±15.23%

Zhou and GUO et al 2020	First premolar		1.74±0.84	2.27±0.86	0.53±0.45	0,005				76.10±18.32%
	Second premolar		1.57±0.96	2.12±1.03	0.65±0.76	0,017				73.27±19.91%
	First molar		1.58±0.97	2.32±1.07	0.74±0.73	0,007				68.31±24.1%
Krieger et al 2012	Upper anterior arch length				0.04±0.65				- 0 . 1 9 ; -0.27	
	Upper intercanine distance				-0.13±0.59				- 0 . 3 3 ; -0.09	
	Lower anterior arch length				0.01±0.48				- 0 . 1 6 ; -0.18	
	Lower intercanine distance				0.13±0.59				- 0 . 1 5 ; -0.31	
Lione et al; 2021	Linear measurement									
	Inter canine width	3-Mar	33.6 ±2.2	35.2±2.3	1,6	P<0.05				
	First inter premolar width	4-Apr	41.3±2.6	41.6±3.0	0,3	NS				
	Second inter premolar width	5-May	47.1±3.0	47.4±3.0	0,3	NS				
	First intermolar width	6-6 mesial cusps	52.3±3.5	52.2±3.4	-0,2	NS				
	First intermolar width	6- distal cusps	53.8±3.7	54.2±3.4	0,4	Ns				
	First intermolar width	6-6 trans palatal	35.2±2.9	35.5±2.4	0,3	NS				
	Second intermolar width	7-7 mesial cusps	57.9±3.9	57.8±3.7	-0,1	NS				
	Second inter molar width	7-7 distal cusps	58.4±4.7	59.0±4.7	0,6	NS				
	Second intermolar width	7-7 transpalatal	39.7±3.9	3,4	1,2	NS				
Houle et al 2017	First inter premolar width			57.8±3.7	0.22 ±0.74	P=0.0225				88,70 %
	Second inter premolar width			59.0±4.7	0.6 ±1.02	P<0.001				67,80 %
	First intermolar width			3.77±2.34	0.58 ±1.14	P=0.001				84,70 %
	First intermolar width			3.36±2.04	1.09 ±1.22	P<0.001				67,60 %
	First intermolar width			4.11±3.06	0.75 ±1.54	P<0.001				81,70 %
	Second intermolar width			3.45±2.56	1.3 ±1.61	P<0.001				62,30 %
	Second inter molar width			3.28±3.13	0.77 ±1.84	P=0.001				76,60 %
	Second intermolar width			3.02±2.58	1.42 ±1.9	P=0.001				52,90 %
	Mand Canine tip			1.39±1.84	-0.08±0.81	P=0.430				100 %
	Mand Canine gingival			1.66±2.12	0.65±1.01	P<0.001				61 %
	Mand 1 st premolar tip			2.47±2.88	0.07±0.96	P=0.520				96,90 %
	Mand 1 st premolar gingival			2.30±2.64	0.27±1.00	P=0.037				88,40 %
	Mand 2 nd premolar tip			3.07±3.12	0.07±1.15	P=0.810				98,90 %
	Mand 2 nd premolar gingival			2.58±2.51	0.38±1.16	P=0.012				85,50 %
	Mand 1 st Molar tip			2.14±2.38	0.03±1.33	P=0.849				100 %
	Mand 1 st Molar gingival			1.84±1.99	0.54±1.34	P=0.002				70,70 %

Table S7: Bucco-lingual /Mesio-distal movement with Clear Aligners:

Author, Year	Analyzed teeth	measurement	pre-treatment (mean ± SD)	Post-treatment (mean ± SD)	Difference (post – pre)	p-value
Lione et al., 2022	Upper first molar	Mesial buccal Sagittal(MS)	29.3 ± 2.2	30.3 ± 2.5	1	<0.001
	Upper first molar	Distal buccal Sagittal(DS)	24.3 ± 2.1	25.2 ± 2.5	0,9	<0.001
Morales-Burruezo et al 2020	Right 1 st Molar	Inclination	-7.77±8.49	-5.51±8.08	2.26±4.76	<0.001
	Left 1 st Molar	inclination	-6.54±8.26	-4.41±7.62	2.13±4.09	<0.001
	Right 1 st molar	No cross-bite group	-5.98±6.57	-4.74±6.16	1.24±3.22	0,039
		Cross bite group	-9.22±9.57	-6.14±9.36	3.08±5.6	0,039
	Left 1 st molar	No cross-bite group	-5.87±7.29	-5.01±6.50	0.85±2.59	0,002
		Cross bite group	-7.09±8.99	-3.93±8.44	3.17±4.76	0,002

Table S8: Accuracy of Labio-Lingual /Mesio-Distal movement. Mpm = prescribed movements; mlc = lack of correction:

Author, Year	Analyzed teeth	Measurement	Post-treatment (mean ± SD)	Planned treatment (mean ± SD)	Difference (post – planned)	p-value	mPM (°)	mlc (°)	p-value	Accuracy	
Lione et al., 2022	Upper first molars	Mesial buccal Sagittal(MS)	30.3 ± 2.5	31.2 ± 2.3	0,9	>0.5				97 %	
	Upper first molars	Distal buccal Sagittal(DS)	25.2 ± 2.5	25.9 ± 2.2	0,7	>0.5				97 %	
Kravitz et al., 2009										MD	LL
	Max central incisors								P<0.05	38,60 %	40,30 %
	Max lateral incisors								P<0.05	43,10 %	47,60 %
	Max canine								P<0.05	35,50 %	44,60 %
	Mand central								P<0.05	39,60 %	44,20 %
	Mand lateral								P<0.05	48,60 %	47,40 %
	Mand canine								P<0.05	26,90 %	43,70 %
Castroflorio et al; 2023							Mesio-distal translation(mm)				
	Max central						0.56±0.50	0.34±0.40	P<0.001		
	Max lateral						0.77±0.75	0.22±0.15	P<0.001		
	Max canine						0.77±0.91	0.27±0.23	P<0.001		
	Max premolars						0.55±0.72	0.25±0.23	P<0.001		
	Max 1 st molars						0.49±0.74	0.21±0.26	P<0.001		
	Max 2 nd molars						0.45±0.78	0.21±0.20	P<0.001		
	Mand incisors						0.61±0.48	0.19±0.14	P<0.001		
	Mand canine						0.50±0.46	0.24±0.21	P<0.001		
	Mand premolars						0.33±0.34	0.31±0.21	P<0.001		
	Mand 1 st molars						0.21±0.31	0.27±0.28	P<0.001		
	Mand 2 nd molars						0.17±0.27	0.28±0.24	P<0.001		
							Buccal/lingual translation(mm)				
	Max central						1.07±0.82	0.14±0.10	P<0.001		
	Max lateral						0.86±0.64	0.20±0.15	P<0.001		
	Max canine						0.75±0.48	0.32±0.22	P<0.001		
	Max premolars						0.97±0.67	0.32±0.24	P<0.001		
	Max 1 st molars						0.70±0.61	0.31±0.24	P<0.001		
	Max 2 nd molars						0.35±0.41	0.36±0.22	P<0.001		
	Mand incisors						1.30±0.92	0.16±0.10	P<0.001		

	Mand canine						0.91±0.72	0.24±0.20	P<0.001		
	Mand premolars						0.93±0.67	0.27±0.19	P<0.001		
	Mand 1st molars						0.65±0.58	0.46±0.45	P<0.001		
	Mand 2 nd molars						0.35±0.44	0.59±0.43	P<0.001		
Ravera et al; 2016	Upper first molar distalization	Mesiobuccal cusp							P=0.43(v e r t i c a l movemen t.	2.2m ml	
		Centre of the crown							p = 0 . 2 7 (tipping movemen t)	2.03mm	
	Upper second molar distalization	Mesiobuccal cusp							P=0.25(v e r t i c a l movemen t.	2.52m ml	
		Centre of the crown							P=0.0.05 6 (tipping movemen t)	2.12	
Haoouili et al 2020										M e s i a l tip	Distal tip
	Max Central Incisor								P<0.05	57,50 %	49,80 %
	Max Lateral Incisor								P<0.05	47,30 %	47,30 %
	Max Canine								P<0.05	52,50 %	43,80 %
	Max First Premolar								P<0.05	43,30 %	57,10 %
	Max Second Premolar								P<0.05	64,70 %	54,20 %
	Max First Molar								P<0.05	47,80 %	58,40 %
	Max Second Molar								P<0.05	55,40 %	62,90 %
	Mand Central Incior								P<0.05	47,80 %	45,50 %
	Mand Lateral Incisor								P<0.05	38,50 %	51,50 %
	Mand Canine								P<0.05	53,70 %	47,50 %
	Mand First Premolar								P<0.05	45,40 %	57,20 %
	Mand Second Premolar								P<0.05	53,60 %	62,50 %
	Mand First Molar								P<0.05	52,60 %	59,20 %
	Mand Second Molar								P<0.05	50,20 %	50,40 %
										Buccal	Lingual
	Max Central Incisor								P<0.05	54.2%	57,40 %
	Max Lateral Incisor								P<0.05	69,90 %	54,40 %
	Max Canine								P<0.05	58,80 %	57,60 %
	Max First Premolar								P<0.05	66,30 %	56,50 %
	Max Second Premolar								P<0.05	60,50 %	51,80 %
	Max First Molar								P<0.05	58,30 %	47,20 %
	Max Second Molar								P<0.05	34,80 %	61,30 %
	Mand Central Incior								P<0.05	52,80 %	64,00 %
	Mand Lateral Incisor								P<0.05	61,40 %	57,40 %
	Mand Canine								P<0.05	67,90 %	54,80 %
	Mand First Premolar								P<0.05	61,10 %	57,90 %
	Mand Second Premolar								P<0.05	69,70 %	51,80 %
	Mand First Molar								P<0.05	53,60 %	48,00 %
Mand Second Molar								P<0.05	36,40 %	46,00 %	
Morales-Burruezo et al 2020	Right 1 st molar		-5.51±8.08	-5.94±7.75	-0.42±3.36				P=0.181	123,50 %	
	Left 1 st molar		-4.41±7.62	-5.29±7.29	-0.88±2.73				P=0.001	170,40 %	

Table S9: Accuracy of Bucco-lingual /Mesio-distal movement. SD = standard deviation

Author, Year	Movement	Staging/Overcorrection	Auxiliaries	Mean Accuracy (mean ± SD)	p-value
Simon et al., 2014	Distalization		With attachments	88,40 %	0,38
			Without attachments	86,90 %	0,46
			Optimized attachments		0,03
Castroflorio et al; 2023			Conventional attachments		0,09
			Optimized attachments		0,03
			Frequency of Aligner Change (7/10 days)	Predictability decrease 12%	0,23
			Frequency of Aligner Change (14days)		0,03
			Frequency of Aligner Change (Constant)		<0.001
Palone et al; 2022	Incisor inclination ≤ 12.2	1.24			0,004
	Incisor inclination ≥ 12.2	2.49			0,004
	Premolar and molar inclination ≤ 10	0.44			<0.001
	Canine ≤ 10	0.77			0,003
	Canine ≥ 10.1	2.13			0,003
	Lower incisors, premolars, molars angulation	0.35			0,002
	Upper incisor canine angulation ≤ 4.2	0.49			0,048
	Upper incisor canine angulation ≥ 4.2	0,79			0,048

Table S10: Accuracy of vertical movements. mPM = prescribed movements; mLC = lack of correction:

Author, Year	Analyzed teeth	Post-treatment (mean ± SD)	Planned treatment (mean ± SD)	Difference (post – planned)	p-value	mPM (°)	mLC (°)	p-value/CI (Confidence interval)	Extrusion accuracy	Intrusion accuracy
Kravitz et al., 2009	Max central incisors							P<0.05	18,30 %	44,70 %
	Max lateral incisors							P<0.05	28,40 %	32,50 %
	Max canine							P<0.05	49,90 %	40,0%4
	Mand central							P<0.05	24,50 %	46,60 %
	Mand lateral							P<0.05	28,40 %	40,00 %
	Mand canine							P<0.05	30,40 %	39,50 %
Krieger et al 2012				-0.71±0.87				CI=-1.02 ; -0.39		
Castroflorio et al; 2023						Vertical translation(mm)				
	Max central					0.76±0.63	0.31±0.26	P<0.001		
	Max lateral					0.67±0.50	0.32±0.25	P<0.001		
	Max canine					0.62±0.44	0.40±0.36	P<0.001		
	Max premolars					0.34±0.27	0.46±0.29	P<0.001		
	Max 1 st molars					0.26±0.31	0.31±0.24	P<0.001		
	Max 2 nd molars					0.31±0.44	0.32±0.34	P<0.001		
	Mand incisors					1.14±0.80	0.34±0.27	P<0.001		
	Mand canine					0.73±0.58	0.33±0.23	P<0.001		
	Mand premolars					0.36±0.23	0.44±0.26	P<0.001		
Haoiuli et al 2020	Mand 1 st molars					0.26±0.29	0.43±0.27	P<0.001		
	Mand 2 nd molars					0.28±0.39	0.27±0.20	P<0.001		
									Intrusion	extrusion
	Max central incisors							P<0.05	33,40 %	56,40 %
	Max lateral incisors							P<0.05	44,60 %	53,70 %
	Max canine							P<0.05	53,30 %	42,20 %

	Max 1 st premolar							P<0.05	48,40 %	51,30 %
	Max 2nd premolar							P<0.05	45,50 %	38,30 %
	Max First molar							P<0.05	35,10 %	37,60 %
	Max Second molar							P<0.05	50,30 %	41,50 %
	Mand central incisors							P<0.05	33,90 %	44,50 %
	Mand lateral incisors							P<0.05	36,70 %	47,10 %
	Mand canine							P<0.05	51,30 %	50,60 %
	Mand1 st premolar							P<0.05	63,10 %	44,50 %
	Mand2nd premolar							P<0.05	56,10 %	52,50 %
	Mand First molar							P<0.05	41,20 %	45,20 %
	Mand Second molar							P<0.05	51,30 %	37,10 %
Karras et al; 2020	Descriptive statistics for optimized extrusion attachments									
	Max central incisor	1.36±1.25	1.45±0.77	0.52±0.37				P<0.05	58,70 %	
	Max lateral incisor	0.54±0.49	1.00±0.51	0.54±0.49				P<0.05	44,80 %	
	Max canine canine	0.52±0.48	1.01±0.85	0.50±0.53				P<0.05	46,60 %	
	Mand incisor	0.72±0.54	1.10±0.87	0.38±0.42				P<0.05	64,80 %	
	Mand canine	0.23±0.12	0.59±0.37	0.37±0.12				P<0.05	54,50 %	
	Descriptive statistics for conventional extrusion attachments									
	Max central incisor	0.94±0.73	1.37±1.21	0.44±0.53				P<0.05	73,90 %	
	Max lateral incisor	0.51±0.37	1.03±0.58	0.52±0.37				P<0.05	48,30 %	
	Max canine canine	0.45±0.43	1.23±0.75	0.78±0.57				P<0.05	34,50 %	
	Mand incisor	0.55±0.66	1.46±0.67	0.92±0.29				P<0.05	27,70 %	
	Mand canine	0.22±0.28	1.00±0.47	0.77±0.30				P<0.05	16,10 %	

Table S11: Accuracy of vertical movement SD = Standard Deviation:

Author, Year	Movement	S t a g i n g / Overcorrections	Auxillaries			Mean accuracy (mean ± SD)	p-value
Karras et al., 2020	Incisors and canine Extrusion		Optimized/conventional attachments.			(conventional -optimized) 0.14±0.42	0,0523
						(optimized – conventional) 4.3±29.8	0,3819
Castroflorio et al; 2023			Conventional attachments				0,09
			Optimized attachments				0,03
			Frequency of Aligner Change (7/10 days)			Predictability decrease 12%	0,23
			Frequency of Aligner Change (14days)				0,03
			Frequency of Aligner Change (Constant)				P<0.001
Palone et al; 2022	Upper canine and premolar intrusion	0.04mm					P<0.001
	Upper Incisors intrusion ≤0.9mm	0.11mm					P=0.002
	Lower canine intrusion ≤0.9mm	0.18mm					P=0.002
	Incisors, Lower canine intrusion >0.9mm	0.20mm					P=0.001
Khosravi et al., 2017			Normal overbite	Deep bite	Open bite		
			Virtual bite ramp	Virtual bite ramp	Extrusion attachment on anterior teeth		
			Cutoff terminal molars or premolars	Vertical posterior elastics	Attachment for intrusion of posterior teeth		
			Cut distal to the canine	No contacts in incisors	Extra thickness of plastic covering posterior teeth		
			Vertical elastics	Overcorrection of Overbite	Overcorrection of Overbite		
			Maintain curve of spee	Level curve of spee	Clenching exercise to intrude posterior teeth		
			Maintain positive occlusal contact on posterior teeth	Level curve of wilson	-		
Ravera et al; 2016			Class II elastics				P<0.05
			Composite attachments				