Table S1. Search strategy for each database and relative results.

Database	Search Strategy	Results
Pubmed	(digital impression) OR (intraoral digital impression) OR (intraoral scanning) OR (intraoral scanner) OR (intraoral digital scanner)	**2877**
CENTRAL	digital impression) OR (intraoral digital impression) OR (intraoral scanning) OR (intraoral scanner) OR (intraoral digital scanner) in Record Title—(Word variations have been searched)	**39**
Cochrane Reviews	digital impression) OR (intraoral digital impression) OR (intraoral scanning) OR (intraoral scanner) OR (intraoral digital scanner) in Record Title—(Word variations have been searched)	**0**
Scopus	TITLE (digital impression) OR (intraoral digital impression) OR (intraoral scanning) OR (intraoral scanner) OR (intraoral digital scanner))	**619**
Web of Science	TITLE: (((digital impression) OR (intraoral digital impression) OR (intraoral scanning) OR (intraoral scanner) OR (intraoral digital scanner))) Timespan: All years. Databases: WOS, KJD, RSCI, SCIELO, ZOOREC. Search language = Auto	**565**
Clinical Trials	(digital impression) OR (intraoral digital impression) OR (intraoral scanning) OR (intraoral scanner) OR (intraoral digital scanner)	**131**
Proquest	Ti((digital impression) OR (intraoral digital impression) OR (intraoral scanning) OR (intraoral scanner) OR (intraoral digital scanner)) in Full text	**29**

Table S2. Characteristics of the clinical studies included in the review. [2,24–48,50]

Studies	Participants	Interventions-Comparison	Outcomes assessed
Burhardt et al. [41] (2016)	Thirty-eight orthodontic patients (22 F, 16 M; 10–17 y, median 12 y) Criteria (+) good physical/mental health; (−) clefts, craniofacial anomalies, dental fear, gag reflex	Group 1: ALG; IOS (LAVA); IOS (CEREC) Group 2: IOS (LAVA); IOS (CEREC); ALG Group 3: IOS (CEREC); ALG; IOS (LAVA)	• **Comfort:** (ALG < CEREC) for mx • **Duration:** (ALG > CEREC > LAVA) • **Time perception:** (ALG < CEREC) • **Preference of method:** (IOS > ALG)
Burzynski et al. [42] (2018)	One hundred-eighty orthodontic patients (104 F, 76 M; 8–56 y, median 15 y) Criteria (+) healthy, english-speaking, seeking ortho Tx or under ortho Tx; (−) mental disabilities, clefts, craniofacial anomalies, syndromes	Group 1: IOS (iTero) Group 2: IOS (TRIOS) Group 3: ALG	• **Duration:** (ALG > IOS) • **Time perception:** (ALG > iTero) • **Comfort:** (iTero > TRIOS/ALG) • **Importance of IOS:** (iTero > TRIOS / ALG) • **Preference of method:** (IOS participants: IOS > ALG) (ALG participants: ALG > IOS)
Christou [26] (2015)	Thirty orthodontic patients (> 19 y) Criteria (+) medically healthy, good oral hygiene, permanent dentition; (-) dentofacial deformities, permanent retainers bonded, extensive restorations, scans not completed, PVS impr not in excellent condition	Each patient: PVS; IOS (Lythos) Extra oral digitization of PVS impr using extra-oral scanner GOM ATOS	• **Accuracy:** [IOS (Lythos) = PVS - linear measurements]
Darroudi et al. [43] (2017)	Ten patients (> 18 y) Criteria (+) full permanent dentition, good general/mental health/oral hygiene; (−) periodontal abnormalities, prostheses, bad quality restorations, orthodontic appliances/fixed retention, poor experience with impressions	Each patient: ALG; PVS; IOS (TRIOS)	• **Preference of method:** (IOS > PVS) • **Time perception:** (IOS > PVS) • **Duration:** (ALG > IOS, PVS)
Duvert et al. [28] (2017)	One patient Criteria (+) complete natural denture	IOS (Lythos, iTero, TRIOS); PVS Extraoral digitization of PVS impr	• **Accuracy:** (PVS > IOS) • **Reproducibility:** (PVS > IOS)
Ender et al. [29] (2016)	Five patients Criteria (+) complete dentition	Each patient: Conv: POE; VSE; VSES; ALG Digit: CEREC Bluecam; CEREC Omnicam; iTero; LAVA; True	• **Accuracy:** [Conv (POE, VSE, VSES) > IOS] (IOS > ALG)

		Definition; 3Shape TRIOS; 3Shape TRIOS color	
Flugge et al. [31] (2013)	One patient	IOS (iTero); POE Extraoral digitization of conv models using D250	• **Accuracy:** (POE > IOS), (D250 > iTero)
Glisic et al. [45] (2019)	Fifty-nine patients (28 F, 31 M; 9–15 y) Criteria (+) indication for ortho Tx; (−) previous orthodontic treatment, craniofacial syndromes	Each patient: ALG; IOS (TRIOS)	• **Comfort:** (TRIOS > ALG) • **Preference of method:** (IOS > ALG)
Grünheid et al. [24] (2014)	Fifteen patients (9 F, 6 M; 19.5 +_ 9.9 y) Criteria (+) full permanent dentition from FM to FM; (−) supernumerary teeth, mental, emotional, developmental disabilities, cleft lip/palate, craniofacial anomalies, epilepsy/seizures, anticonvulsants	Each patient: ALG; IOS (LAVA)	• **Accuracy:** (ALG = IOS) • **Preference of method:** (ALG > IOS) • **Duration:** (ALG > IOS)
Kierl [34] (2018)	Twenty-five patients Criteria (+) student volunteers from the OU College of Dentistry, all permanent teeth, FM to FM in both dental arches, minimal dental crowding (< 4 mm)	Each patient: IOS (iTero, TRIOS); ALG	• **Accuracy:** (IOS > ALG); (TRIOS = iTero)
Kim et al. [47] (2016)	Four patients and twenty-nine dental hygienists as operators Criteria (+) no experience using 3D digital IOS, currently working in clinical practice were recruited	Each participant: IOS (iTero, TRIOS)	• **Duration:** (TRIOS > iTero) • **Easier-faster learning rate:** (iTero > TRIOS)
Kirschneck et al. [40] (2018)	Twenty patients (18–30 y) Criteria (+) complete permanent dentition, no current caries activity, gingivitis, periodontal disease or other oral pathology; (-) systemic diseases, congenital anomalies and syndromes, current orthodontic treatment, allergies to any component of the applied impression materials.	Each patient: POE; ALG; IOS (Lythos) Extraoral digitization of conv models using both the 3Shape D810 (3shape) scanner and the Atos II Triple Scan (GOM)	• **Reproducibility:** (ALG > IOS) (D810 = Atos II Triple Scan)
Kuhr et al. [30] (2016)	Fifty patients (25 F;25 M) Criteria (+) complete lower dental arch (fully dentate or fixed restorations)	Each patient: POE; IOS (CEREC, TRIOS, 3M True Definition)	• **Accuracy:** [POE > IOS (3M True Definition, TRIOS, CEREC)]
Lim et al. [48] (2017)	One patient and twenty dental hygienists (20 F) as operators Criteria (+) > 3 y of experience in dental clinical practice (group 1: 3–5 y; group 2: > 6 y)	IOS (iTero, TRIOS) for each of the operators	• **Easier-faster learning rate:** (TRIOS = iTero)**;** affecting the fidelity of scanned images
Mangano et al. [2] (2018)	Thirty patients (15 F, 15 M; 7–16 y); Criteria (+) good oral health/hygiene; (−) periodontal disease, history of ortho TX, prostheses	Each patient: ALG; IOS (CS3600)	• **Comfort:** (ALG < IOS) • **Duration:** (ALG > IOS) • **Time perception:** (ALG < IOS) • **Preference of method:** (IOS > ALG)
Naidu et al. [37] (2013)	Thirty patients Criteria (+) full complement of permanent teeth, no missing or heavily restored teeth, no teeth with large carious lesions or enamel defects	Each patient: ALG; IOS (iOC)	• **Reproducibility:** (IOS > ALG)
Nedelcu et al. [35] (2017)	Five patients Criteria (+) only second premolar missing, residual spacing in the premolar to premolar area.	Each patient: IOS (3M True Definition, CEREC, TRIOS); POE	• **Accuracy:** (IOS = POE); (TRIOS > CEREC)
Park et al. [46] (2015)	Twenty-four patients (dental hygienists)	Each participant: IOS (iTero, TRIOS)	• **Preference of scanner:** (TRIOS > iTero) (as operators)

	Criteria (+) no previous experience with IOS	Each participant served both as operator and patient	
Rhee et al. [32] (2015)	Twenty-four patients Criteria (+) no periodontitis or temporomandibular joint disease	Each patient: PVS; IOS (TRIOS) Extraoral digitization of conv models using 3D laser scanner	• **Accuracy:** (PVS > IOS) 3d deviations: (IOS, dual arch > full arch, dual arch), 2d deviations (PVS > IOS)
San Jose et al. [33] (2017)	One hundred patients (53 F, 47 M; 21.6 to 29.2 y) Criteria (+) permanent dentition from FM to FM, initial records included a CBCT, an intraoral scan and plaster models; (-) tooth agenesis or extractions, large restorations that could change the mesiodistal diameters of the teeth, teeth with anomalous shapes, infraoccluded teeth.	Each patient: CBCT; IOS (iTero); plaster models Extraoral digitization of conv models using intraoral laser scanner (ILS)	• **Accuracy:** (IOS > CBCT)
Schott et al. [50] (2019)	Thirty-one patients (dental students) (22 F, 9 M; 21-31 y) 96.8% no previous experience with IOS	Each patient: ALG; IOS (3M True Definition)	• **Preference of method:** (IOS > ALG)
Sfondrini et al. [25] (2018)	Fourteen patients (10 F, 4 M; mean 20.4 y) Criteria (+) full permanent dentition; (−) supernumerary teeth; mental or developmental disabilities, craniofacial anomalies, epilepsy, dental fear, gag reflex	Each patient: ALG; IOS (TRIOS)	• **Preference of method:** (IOS > ALG) • **Overall impression:** Gag reflex (IOS > ALG) Equipment size (IOS > ALG) • **Comfort:** (IOS > ALG) • **Time perception:** (IOS > ALG) • **Duration:** (IOS > ALG)
Sun et al. [36] (2018)	Twenty patients (>18 y old) Criteria (+) full permanent dentition, no metal or gold crown restorations, without severe crowding and dentofacial deformity	Each patient: IOS (TRIOS); ALG Extraoral digitization of conv models using TRIOS	• **Reproducibility:** (in vivo scanning = ex vivo scanning)
Wiranto et al. [39] (2013)	Twenty-two patients Criteria (+) complete permanent dentition from FM to FM in both arches, no fixed orthodontic appliances, no severe crowding in the dentition (\6 mm).	Each patient: IOS (LAVA); ALG (CBCT scans of alginate impr)	• **Reproducibility:** (IOS scanning = CBCT scanning)
Yoon et al. [38] (2018)	Forty-six patients Criteria (+) absence of dentofacial deformity or medical problems, absence of previous orthodontic history with fixed appliances, eruption of all permanent teeth, no impacted, missing, or supernumerary teeth, availability of an intraoral-scan model and a cast model.	Each patient: IOS (TRIOS); ALG	• **Reproducibility:** (IOS = ALG)
Yuzbasioglu et al. [44] (2014)	Twenty-four patients (12F, 12M; 21.87 ± 2.76 y) Criteria (+) good general/mental health and oral hygiene; (−) periodontal disease, prostheses, moderate to excessive dental anxiety, ortho Tx	Each patient: POE; IOS (CEREC)	• **Comfort:** (CEREC > POE) • **Time perception:** (CEREC > POE) • **Preference of method:** (IOS > POE) • **Duration:** (CEREC = POE)
Zimmermann et al. [27] (2017)	Five patients Criteria (+) complete natural dentition	Each patient: IOS (CEREC, Lythos); ALG	• **Accuracy:** (IOS > ALG)

POE : Polyether, VSE: vinylsiloxanether, VSES: direct scannable vinylsiloxanether, ALG: Alginate, PVS: poly-vinyl-siloxane, conv: conventional, digit: digital, mx =maxilla, ortho TX = orthodontic treatment, IOS: intraoral scanner-intraoral scanning, F: female, M: male, y: years, impr: impression, FM: first molar, >: more acceptable, <: less acceptable, (+): inclusion criteria, (-): exclusion criteria.