**Table S1.** The full search string of each database.

| Source | Search terms |
|---|---|
| PubMed | *Concept 1: soft tissue*<br>Soft-tissue*[tiab] OR "face profile"[tiab] OR "facial profile"[tiab] OR profile-change*[tiab]<br>*Concept 2: orthognathic surgery*<br>"Orthognathic Surgery"[Mesh] OR orthognathic-surg*[tiab] OR jaw-surg*[tiab] OR "Orthognathic surgical procedures"[Mesh] OR maxillomandibular*[tiab] OR bimaxillary-surg*[tiab] OR "Mandibular advancement"[Mesh] OR mandibular-advance*[tiab] OR "mandibular setback"[tiab] OR "Osteotomy, Le Fort"[Mesh] OR Le-Fort*[tiab] OR LeFort*[tiab] OR "Osteotomy, sagittal split ramus"[Mesh] OR sagittal-split*[tiab] OR BSSO[tiab] OR SSRO[tiab] OR IVRO[tiab] |
| Embase | *Concept 1: soft tissue*<br>'soft tissue'/exp OR 'soft tissue*':ti,ab,kw OR 'face profile'/exp OR 'facial profile':ti,ab,kw OR 'profile change*':ti,ab,kw<br>*Concept 2: orthognathic surgery*<br>'orthognathic surgery'/exp OR 'orthognathic surg*':ti,ab,kw OR 'bimaxillary surg*':ti,ab,kw OR 'maxillomandibular*':ti,ab,kw OR 'jaw surg*':ti,ab,kw OR 'Maxillomandibular*':ti,ab,kw OR 'mandibular osteotomy'/exp OR 'mandibular advance*':ti,ab,kw OR 'mandibular setback*':ti,ab,kw OR 'sagittal split*':ti,ab,kw OR 'BSSO':ti,ab,kw OR 'SSRO':ti,ab,kw OR 'IVRO':ti,ab,kw OR 'Maxilla osteotomy'/exp OR 'Le Fort*':ti,ab,kw OR 'LeFort*':ti,ab,kw |
| Web of science | Concept 1: soft tissue<br>"Soft tissue*" OR "face profile" OR "facial profile" OR "profile change*"<br>Concept 2: orthognathic surgery<br>"Orthognathic Surg*" OR "jaw surg*" OR maxillomandibular* OR "bimaxillary surg*" OR "mandibular advance*" OR "mandibular setback" OR "Le Fort*" OR LeFort* OR "sagittal split*" OR BSSO OR SSRO OR IVRO |
| Cochrane | *Concept 1: soft tissue*<br>((Soft NEXT tissue*) OR face profile OR facial profile OR (profile NEXT change*)):ti,ab,kw<br>*Concept 2: orthognathic surgery*<br>([mh "Orthognathic Surgery"] OR [mh "orthognathic surgical procedures"] OR [mh "mandibular advancement"] OR [mh "osteotomy, Le Fort"] OR [mh "Osteotomy, sagittal split ramus"]) OR (orthognathic NEXT surg*)OR (jaw NEXT surg*) OR maxillomandibular* OR (bimaxillary NEXT surg*) OR (mandibular NEXT advance*) OR mandibular setback OR (Le NEXT Fort*) OR LeFort* OR (sagittal NEXT split*) OR BSSO OR SSRO OR IVRO):ti,ab,kw |

**Table S2.** Methodological data of the studies included in the review.

| Year, first author | Study design | Sample size | Mean age (years) | Gender | Diagnosis | CBCT/ MSCT[a] | 3D photo[a] | Software package and/or algorithm | Type of surgery | Results[b] |
|---|---|---|---|---|---|---|---|---|---|---|
| 2004, Chabanas | NR | 3 | NR | NR | NR | MSCT** | No | FEM | NR | ME range 1 - 1.5 mm, MaxE 3–6 mm |
| 2007, Mollemans | RS | 10 | NR | NR | C II, C III | MSCT** | Yes | (1)linear FEM; (2)non-linear FEM; (3)MSM; (4)MTM | TRIMAX, BIMAX, BSSO, BSSO+Ch, LFI+Ch | The average median distance for MTM: 0.60 mm, FEM: 0.60 mm, MSM: 0.64 mm, NFEM: 0.63 mm, average 90th percentile distance for MTM: 1.48mm, FEM: 1.51mm, MSM: 1.67mm, NFEM: 1.71mm; Highest accuracy: FEM and MTM |
| 2007, Marchetti | NR | 25 | 25.1^^ | F: 17, M: 8 | NR | MSCT | No | VISU system | LFI, BSSO, LFI+Ch, BSSO+Ch, BIMAX, TRIMAX | Error < 2mm in 80% (20 of 25) of the patients |
| 2010, Bianchi | NR | 10 | 24 | F: 4, M: 6 | NR | CBCT | No | SurgiCase CMF Pro v.1.2 | BIMAX/ TRIMAX | ME: 0.94 mm; error < 2 mm in 86.8% of the simulations; 90th percentile: 2.24mm, 95th percentile: 2.81 mm. |
| 2010, Ulusoy | NR | 6 | 24 ± 6.1 | F: 2, M: 5* | * | MSCT** | No | Dynamic volume spline | BIMAX * | ME: 1.8 mm |
| 2011, Centenero | PS | 16 | NR | NR | C II, C III, As | MSCT/ CBCT | No | SimPlant ProOMS v.10.1 | BIMAX, TRIMAX, BSSO+Ch | 5 of 8 ST measurements: high degree of correlation, 3 measurements: medium degree of correlation |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 2011, Marchetti | NR | 10 | NR | F: 5, M: 5 | MH and mandibular prognathism | MSCT | No | SurgiCase CMF Pro v.1.2 | BIMAX, TRIMAX | ME: 0.75 +/- 0.78 mm; error < 2 mm in 91% of the simulations; 90th percentile: 1.94 mm, 95th percentile: 2.47 mm |
| 2013, Schendel | NR | 23 | 31 | F: 13, M: 10 | Maxillary, mandibular retrusion, microgenia | CBCT | Yes[c] | 3dMDVultus - MSM | LFI, BSSO, Ch | Entire face ME: 0.27 mm, ComR: 1.10mm, ComL 0.99mm, Pog 0.79mm |
| 2013, Shafi | RS | 13 | 23 ± 8 | F: 8, M: 5 | C III | CBCT | No | Maxilim v.2.2.0 - MTM | LFI | ME: 0.97 mm; all anatomical regions with error significantly < 3.0 mm, exception UL error: 2.73 +/- 1.72; overprediction of UL |
| 2013, Nadjmi | NR | 13 | NR | F: 11, M: 2 | NR | CBCT**, lat ceph | Yes** | (1)2D Dolphin v.10 - fixed hard-tissue to soft-tissue ratios; (2)Maxilim - MTM | LFI, LFI+Ch, BIMAX, TRIMAX | Dolphin range of error in horizontal position: -1.41 to 1.20 mm, in vertical position: -1.85 to 1.55 mm; Maxilim range of error in horizontal position: -1.60 to 1.50 mm, in vertical position: -4.25 to 2.42 mm. No statistical differences between softwares, exception SA in Maxilim |
| 2014, Terzic | RS | 13 | 25.2 | F: 8, M: 5 | NR | MSCT/ CBCT | Yes[c] | 3dMDvultus v.2.2.0.8 - MSM | BSSO, BSSO+Ch, BIMAX, TRIMAX | ME for the upper part +0.27 mm, the lower part –0.64 mm; in the lower part error < +/-1mm 26.9%, > +/- 1mm 73,1%, > +/-2mm 49.5% and > +/-3mm 29.8% |
| 2014, Nadjmi | NR | 20 | 23 ± 9^^ | F: 15, M: 5 | C I, C II, C III, As | CBCT | No | Maxilim - MTM | BSSO, BIMAX, TRIMAX | ME: 1.18 mm; 84% of errors between -2 mm and +2 mm |
| 2015, Ullah | RS | 13 | 23 ± 8 | F: 8, M: 5 | C III | CBCT | No | 3dMDVultus v.2.2.0 - MSM | LFI | ME: 0.92 mm (0.3–2.4 mm); 90th percentile from 0.65 mm (chin) to 1.17 mm (UL). ME significantly < 3 mm. The 95% CI in all regions < 2 mm |
| 2015, Khambay | RS | 10 | NR | NR | NR | CBCT** | No | 3dMDvultus v.2.2.0 - MSM | LFI | ME for 95th percentile: 0.98 mm - 0.56 mm, for 90th percentile: 0.91 mm - 0.50 mm; error < 2 mm: 94.4% - 85.2% points. The RMS error: 2.49 mm- 0.94 mm. The RMS difference for all measurements: 1.3 mm |
| 2015, Nam | RS | 29 | NR | F: 13, M: 16 | NR | MSCT | No | Simplant Pro | BIMAX, TRIMAX | ME in all landmarks: 2.03mm. Error < 2mm: 52.8%. Absolute error values in the x-axis: 0.73mm, y-axis: 1.39mm, z-axis 0.85mm; error significantly > 2 mm: ChR, ChL, LL, Pog. MaxE: 2.38mm in ChL, MinE: 0.84mm in pronasale. |
| 2015a, Liebregts | RS | 60 | 26 | F: 45, M: 15 | NR | CBCT | No | Maxilim - MTM | BIMAX | Landmarks: MaxE at LI 3.1 +/- 1.4 mm, MinE at SN 1.5 +/- 0.6 mm. Surfaces: entire face ME: 0.81 +/- 0.22 mm, for UL: 1.2 +/- 0.6 mm, LL: 1.4 +/- 0.5 mm, chin: 1.1 +/- 0.6 mm; Error equal or < 1 mm: 83.3%, < 2 mm: 100%. ME among patients who had a V-Y closure significantly smaller than those without a V-Y closure. |
| 2015b, Liebregts | RS | 100 | 31.6^^ | F: 65, M: 35 | C II | CBCT | No | Maxilim v.2.2.2.1 - MTM | BSSO | Landmarks: ME at SN 1.1 +/- 0.5 mm, at LS 1.5 +/- 0.7 mm, at LI 2.0 +/- 1.0 mm, at sublabiale 1.7 +/- 1.1 mm , at Pog 1.5 +/- 0.9 mm. Surface: entire face ME: 0.9 +/- 0.3 mm; error equal or < 2 mm: 100%, <1 mm: 78%. ME for UL 0.9+/-0.5, LL 1.2+/-0.5, and chin 0.8 +/- 0.5mm. Average absolute error less or equal to 2 mm for UL: 98%, for LL 94% , and for the chin 97% |
| 2015, Van Hemelen | PS | 31 | * | * | C II, C III | CBCT | No | Maxilim - MTM | BSSO, BSSO+Ch, LFI, LFI+Ch, BIMAX, TRIMAX | ME in the horizontal direction: 1.48 mm, in the vertical direction: 1.46 mm |
| 2016, Liebregts | RS | 60 | 26 | F: 45, M: 15 | NR | CBCT | No | Maxilim - MTM | BIMAX | ME: 1.0 +/-0.9 mm in alar width |
| 2016, Resnick | RS | 7 | 18.1 ± 1.0 | F: 5, M: 2 | MH | CBCT | Yes[c] | Dolphin 3D v.11.8 - sparse landmark-based algorithm | LFI | ME: 2.91 +/- 2.16 mm, for midline points: 1.66 +/- 1.82 mm, for lateral points: 3.84 +/- 1.92 mm. 2 (33%) midline points with error > 2 mm (SN, SA), 6 (75%) lateral points > 2 mm. ME at NLA: 8.1 +/- 5.6 degrees |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 2017, Kim | RS | 40 | 22.5 ± 3.2 | F: 22, M: 18 | C I, C II, C III | MSCT** | Yes[c] | FEM with the mucosa sliding effect | BIMAX, TRIMAX | Quantitative: entire face ME 1.1 +/- 0.3mm, UL 1.2 +/- 0.7 mm, LL 1.5 +/- 0.7 mm, chin 1.3 +/- 0.7. Qualitative: 80% (32/40) clinically acceptable |
| 2021, Kim | RS | 35 | 23.0 ± 4.0 | F: 17, M: 18 | C I, C II, C III | MSCT** | Yes[c] | FEM with the sliding effect of the lip and the mucosa | BSSO, BIMAX, TRIMAX | Quantitative: entire face ME 1.03 +/- 0.30 mm, UL 0.86 +/- 0.36 mm, LL 1.10 +/- 0.41 mm, chin 1.08 +/- 0.51mm. Qualitative: improvement in lips compared with previous FEM methods |
| 2017, Mundluru | RS | 13 | NR | NR | As | CBCT | No | Maxilim - MTM | BIMAX, BSSO, BSSO+Ch | Underprediction of ST changes. The signed ME from -0.55 to 0.43 mm; The absolute ME from 0.6 to 1.3 mm |
| 2018, Holzinger | PS | 16 | 26 | F: 8, M: 8 | OB: C II, C III | MSCT | No | SOTIRIOS | NR - surgery first | ME: 1.46 +/- 1.53 mm; 50% < 1.03 mm, 80% < 2.20 mm, and 95% up to 4.34 mm |
| 2019, Knoops | RS | 7 | 18 ± 1 | F: 5, M: 2 | MH | CBCT | No | (1)Dolphin 3D v.11.95 - sparse landmark-based algorithm; (2)ProPlan CMF v.3.0.1 - FDM; (3)PFEM | LFI | RMSDolphin = 1.8 +/-0.8 mm, RMSPro-Plan = 1.2+/-0.4 mm, and RMSPFEM = 1.3+/-0.4 mm; average percentage of points <2 mm: PDolphin = 83+/-12%, PProPlan = 91+/-9%, and PPFEM = 88+/-10%. Better results for ProPlan and PFEM compared to Dolphin |
| 2019, Elshebiny | RS | 20 | 22.7 ± 2.1 | F: 11, M: 9 | NR | CBCT | No | Dolphin 3D v.11.9 - sparse landmark-based algorithm | BIMAX/TRIMAX | Statistically significant differences in 2 angular measurements (FNA, NLA) and in 3 linear measurements (SA, UL length and subalar width) |
| 2021, Cunha | RS | 16 | 36 | F: 11, M: 5 | C II | MSCT** | No | Orto-gOnBlender-OOB - MSM | BIMAX/TRIMAX | ME for all landmarks < 2 mm, entire face ME: 1.07mm . MaxE: ChR, ChL, and SB |
| 2021, Willinger | NR | 19 | 22 | F: 5, M: 14 | midfacial deficiency, C III | MSCT/ CBCT** | No | (1)IPS Case Designer - MTM; (2)Dolphin 3D v.11.95 - sparse landmark-based algorithm | modified IQLFIIO +/- BSSO | IR level: Dolphin ME 2.90 +/- 2.1mm, IPS ME 1.70 +/- 1.3mm; SF level: Dolphin ME: 3.57 +/- 2.0mm, IPS ME: 1.34 +/- 0.9mm; LI level: Dolphin ME 2.48 +/- 1.9mm, IPS ME 2.25 +/- 1.6mm. MaxE for Dolphin at SF level |
| 2021, Tanikawa | RS | 72 | 23.5 | NR | C III | No – lat ceph | Yes | Geometric morphometric methods (GMM), DL | BIMAX | The system error 0.89 ± 0.30 mm. MaxE of 0.8–1.2 mm in the nasal ala, chin, corner of the mouth; the total success rate at < 1 mm: 54%; and at < 2 mm: 100% |
| 2021, ter Horst | RS | 14 | 34.2 ± 13.0 | F: 11, M: 3 | C II | CBCT | Yes[c] | DL; IPS CaseDesigner - MTM | BSSO | DL-based: The lower face ME: 1.0 +/- 0.6 mm, simulations with MaxE of 1 mm: 64.3% and of 2 mm: 92.9%. RMS 1.2 +/- 0.6 mm; ME for LL 1.1 +/- 0.9 mm; for the chin 1.4 +/- 0.9 mm. MTM-based: The lower face ME: 1.5 +/- 0.5 mm, simulations with MaxE of 1 mm: 21.4% and of 2 mm: 85.7%. RMS 2.0 +/- 0.7 mm; ME for LL 1.7 +/- 0.9 mm; for the chin 2.0 +/- 1.0 mm. The DL model with higher accuracy |
| 2021, Alcañiz | RS | 10 | 32 | F: 8, M: 2 | C II, C III, As, OB | CBCT** | Yes** | FEM | LFI, LFII, BSSO, USSO, Ch, BIMAX | Surface with error < 3mm with coarse meshes: 92%, with fine meshes: 95% |
| 2022, Lee | RS | 10 | NR | NR | C III | CBCT** | Yes**[c] | ProPlan CMF - FDM | BIMAX | Entire face ME: 0.73 +/- 0.21mm, for LL: 1.42 +/- 0.77mm, for UL: 1.14 +/-0.80mm, for chin: 0.95 +/-0.58mm; error < 2mm: 90.9% |
| 2022, Gutiérrez | RS | 10 | 32 | F: 8, M: 2 | C II, C III, As, OB | CBCT** | Yes** | FEM | LFI, LFII, BSSO, USSO, Ch, BIMAX | All distances for both meshes and their mean distances significantly < 2 mm, except LL, RGo and LGo. Distances for all landmarks significantly < 3 mm, except for LL of the fine mesh |
| 2022, Yamashita | RS | 88 | NR^ | F: 62, M: 26 | C II, C III | CBCT | No | Dolphin 3D v.11.95 - sparse landmark-based algorithm | BIMAX, TRIMAX | C II: underprediction with downward direction in S-Y, S-Z, LI-Y, SB-Y, Pog-Y, Pog-Z, Gn-Y, Gn-Z, Me-Y, Me-Z, values > 2 mm: LI-Y, SB-Y, Pog-Y, Gn-Y, Gn-Z, Me-Y. MaxE LI-Y: 2.73 mm. C III: overprediction and downward direction in Pog-Z, Gn-Y, Gn-Z, Me-Y, and Me-Z, all discrepancies < 2 mm. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 2022, Ma | NR | 40 | NR^ | F: 24, M: 16 | NR | MSCT** | No | FSC-Net, point cloud DL | NR | Qualitative: FSC-Net comparable with FEM-RLSE. Quantitative: landmarks entire face ME 2.95 +/-0.61mm; surface entire face ME: 1.55 +/- 0.30mm, lips 1.58 +/- 0.26mm, chin: 2.11 +/- 0.77mm; FSC-Net comparable with FEM-RLSE |
| 2022, Awad | NR | 20 | 27.3 | F:10, M:10 | C II, C III | CBCT | Yes | IPS CaseDesigner v.2.1.4.4 - MTM | BIMAX | Entire face ME: -1.5 to 1.4 mm, UL -2.5 to 1.3 mm, LL -2.1 to 2.5 mm, chin -1.8 to 2.6 mm |
| 2022, Hou | RS | 58 | 26.7 | F: 37, M: 21 | C III | CBCT | Yes[c] | ProPlan CMF - FDM | BIMAX | Entire face ME: 1.43 +/- 0.40 mm. Error of UL, LL, chin, right external buccal and left external buccal > 2.0 mm; LL the least predictable: 2.69 ± 1.25 mm |
| 2023, Şenyü-rek | RS | 16 | 18.5 ± 2.13 | NR | MH | CBCT** | No | ProPlan CMF v.3.0 - FDM | LFI | Error in UL and LL: 1.49 +/- 0.77 mm, in cheeks: 0.98 +/- 0.34 mm, nose: 0.86 +/- 0.23 mm, and eyes: 0.76 +/- 0.32 mm |
| 2023, Ruggiero | PS | 5 | NR | NR | NR | CBCT + MRI | No | FEM with patient-specific model generated from CBCT and MRI | BIMAX | Midface ME: 0.55 +/- 2.29 mm |
| 2024, Fang | RS | 40 | NR | NR | NR | MSCT** | No | DL, ACMT-Net with the CPSA module | BIMAX | Quantitative: Surface entire face ME 1.06 +/- 0.43 mm, UL 1.13 +/- 0.71 mm, LL 1.23 +/- 0.48 mm, chin 1.13 +/- 0.62mm; landmarks entire face ME 2.44 +/- 0.45 mm, upper face 1.23 +/- 0.47 mm, lower face 3.25 +/- 0.66 mm Qualitative: 77.5% (31/40) of the simulations clinically acceptable |

^ only range was reported; ^^ growing patients also included in the study group < 14yo; *not clear; ** device not specified; [a] details in the appendix D; [b] most relevant results; [c] 3D photograph fused with the MSCT/CBCT skin surface; As, asymmetry; BIMAX, bimaxillary osteotomy; BSSO, bilateral mandibular sagittal split osteotomy; Ch, genioplasty; ChL, cheilion left; ChR, cheilion right; C, Class; ComL, left commissure; ComR, right commissure; DL, deep learning; F, female; FDM, finite difference method; FEM, finite element model; FNA, frontonasal angle; Gn, soft tissue gnathion; IR, infraorbital rim; IQLFIIO, intraoral quadrangular Le Fort II osteotomy; lat ceph, lateral cephalograms; LFI, Le Fort I maxillary osteotomy; LGo, soft tissue left gonion; Li, crown of the lateral incisor; LI, labrale inferior; LL, lower Lip; LS, labrale superior; M, male; MaxE, maximal error; Me, soft tissue menton; ME, mean error; MH, maxillary hypoplasia; MinE, minimal error; MSM, mass spring model; MTM, mass tensor model; NLA, nasolabial angle; NR, not reported; OB, open bite; PFEM, probabilistic FEM; Pog, soft tissue pogonion; PS, prospective study; RGo, soft tissue right gonion; RMS, root mean square distance; RS, retrospective study; S, stomion; SA, soft tissue A point; SB, soft tissue B point; SF, sinus floor; SN, subnasale; ST, soft tissue; TRIMAX, bimaxillary osteotomy and genioplasty; UL, upper Lip; USSO, unilateral mandibular sagittal split osteotomy. C I, correct relationship between the maxilla and the mandible. C II, retrusive mandible in relation to the maxilla; C III, protrusive mandible in relation to the maxilla.

**Table S3.** The revised Quadas2 tool for risk of bias and applicability assessment.

| Study | Risk of Bias | | | | Applicability | | |
|---|---|---|---|---|---|---|---|
| | Patient selection | Index Test | Reference Standard | Flow and Timing | Patient selection | Index Test | Reference Standard |
| 2004, Chabanas | ☹ | 😊 | 😊 | ☹ | 😐 | ☹ | 😊 |
| 2007, Mollemans | 😐 | 😊 | 😊 | ☹ | 😊 | ☹ | 😊 |
| 2007, Marchetti | 😊 | ☹ | 😊 | ☹ | ☹ | ☹ | 😊 |
| 2010, Bianchi | 😐 | 😊 | ☹ | ☹ | 😊 | ☹ | 😊 |
| 2010, Ulusoy | 😐 | ☹ | 😊 | 😐 | 😐 | ☹ | 😊 |
| 2011, Centenero | 😐 | ☹ | 😊 | ☹ | 😊 | ☹ | 😊 |
| 2011, Marchetti | 😊 | 😊 | 😊 | ☹ | ☹ | ☹ | 😊 |
| 2013, Schendel | ☹ | ☹ | 😊 | ☹ | ☹ | ☹ | 😊 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2013, Shafi | | | | | | | |
| 2013, Nadjmi | | | | | | | |
| 2014, Terzic | | | | | | | |
| 2014, Nadjmi | | | | | | | |
| 2015, Ullah | | | | | | | |
| 2015, Khambay | | | | | | | |
| 2015, Nam | | | | | | | |
| 2015a, Liebregts | | | | | | | |
| 2015b, Liebregts | | | | | | | |
| 2015, Van Hemelen | | | | | | | |
| 2016, Liebregts | | | | | | | |
| 2016, Resnick | | | | | | | |
| 2017, Kim | | | | | | | |
| 2021, Kim | | | | | | | |
| 2017, Mundluru | | | | | | | |
| 2018, Holzinger | | | | | | | |
| 2019, Knoops | | | | | | | |
| 2019, Elshebiny | | | | | | | |
| 2021, Cunha | | | | | | | |
| 2021, Willinger | | | | | | | |
| 2021, Tanikawa | | | | | | | |
| 2021, ter Horst | | | | | | | |
| 2021, Alcañiz | | | | | | | |
| 2022, Lee | | | | | | | |
| 2022, Gutiérrez | | | | | | | |
| 2022, Yamashita | | | | | | | |
| 2022, Ma | | | | | | | |
| 2022, Awad | | | | | | | |
| 2022, Hou | | | | | | | |
| 2023, Şenyürek | | | | | | | |
| 2023, Ruggiero | | | | | | | |
| 2024, Fang | | | | | | | |

 Low risk  Unclear risk  High risk.

**Table S4.** Image acquisition technique and device.

| Year, author | Image acquisition | |
|---|---|---|
| | MSCT/CBCT device | 3D photograph device |
| 2004, Chabanas | MSCT * | |
| 2007, Mollemans | MSCT * | 3D camera system (Eyetronics, Leuven, Belgium) |
| 2007, Marchetti | MSCT - High Speed Spiral (GE,Waukesha, WI) | |

| | | |
|---|---|---|
| 2010, Bianchi | CBCT - NewTom 3G (QR, Verona, Italy) | |
| 2010, Ulusoy | MSCT* | |
| 2011, Centenero | MSCT - General Electric HiSpeed; CBCT - IS I-CAT 17-23 | |
| 2011, Marchetti | MSCT - 16 slices Light Speed (GE, Milwaukee, WI, USA) | |
| 2013, Schendel | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | 3dMD (Atlanta, GA, USA) |
| 2013, Shafi | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | |
| 2013, Nadjmi | CBCT*; CBCT synthesized lateral cephalograms | * |
| 2014, Terzic | MSCT - Siemens Sensation 64; (Germany) / CBCT - NewTom VGi (QR, Verona, Italy) | 3dMDTrio System (3dMD, Atlanta, GA, USA) |
| 2014, Nadjmi | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | |
| 2015, Ullah | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | |
| 2015, Khambay | CBCT* | |
| 2015, Nam | MSCT - GE lightspeed VCT XT(GE,Milwaukee, WI, USA) | |
| 2015a, Liebregts | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | |
| 2015b, Liebregts | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | |
| 2015, Van Hemelen | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | |
| 2016, Liebregts | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | |
| 2016, Resnick | CBCT: i-CAT (Imaging Sci. Int., Hatfield, PA, USA) /Planmeca Promax 3D Max (Planmeca, Roselle, IL, USA) | 3D VECTRA M3 (Canfield Scientific, Fairfield, NJ, USA) |
| 2017, Kim | MSCT* | 3dMD (Atlanta, GA, USA) |
| 2021, Kim | MSCT* | 3dMD (Atlanta, GA, USA) |
| 2017, Mundluru | CBCT - iCAT (Imaging Sci. Int., Hatfield, PA, USA) | |
| 2018, Holzinger | MSCT - Philips Brilliance 64 (Amsterdam, NL) | |
| 2019, Knoops | CBCT: i-CAT (Imaging Sci. Int., Hatfield, PA, USA) /Planmeca Promax 3D Max (Planmeca, Roselle, IL, USA) | |
| 2019, Elshebiny | CBCT CB Mercuray (Hitachi Medical Systems America, Twinsburg, OH) | |
| 2021, Cunha | MSCT* | |
| 2021, Willinger | MSCT/CBCT* | |
| 2021, Tanikawa | lateral cephalograms | 3dMD cranial System (3dMD, Atlanta, GA, USA) |
| 2021, ter Horst | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | 3dMD face System (3dMD, Atlanta, GA, USA) |
| 2021, Alcañiz | CBCT* | * |
| 2022, Lee | CBCT* | * |
| 2022, Gutiérrez | CBCT* | * |
| 2022, Yamashita | CBCT - i-CAT (Imaging Sci. Int., Hatfield, PA, USA) | |
| 2022, Ma | MSCT* | |
| 2022, Awad | CBCT - KaVo 3D (KaVo Dental GmbH; Biberach an der Riß, Germany) | 3dMDTrio System (3dMD; Brentford, London, UK) |
| 2022, Hou | CBCT - NewTom (NewTom AG, Marburg, Germany) | 3dMDTrio System (3dMD, Atlanta, GA, USA) |
| 2023, Şenyürek | CBCT * | |
| 2023, Ruggiero | CBCT - NewTom 3000 VGI Evo (Cefla Group, Imola, Italy), MRI – GE 1.5 T | |
| 2024, Fang | MSCT* | |

* device not specified.