ABSTRACTS

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Comprehensive analysis of the volume of bone for grafting that can be harvested from iliac crest donor sites

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Our aim was to calculate the volumes of cancellous, cortical, and corticocancellous bone that can be harvested as a graft from the anterior and posterior iliac crests using 3-dimensional computed tomography (CT) and software in a living adult population. We selected random CT scans of the pelvis from 31 men and 29 women from the Department of Radiology imaging database. CT data in DICOM file format were imported into Mimics software. The anterior iliac crest and posterior iliac crest bone graft-harvested boundaries were measured. The volume of the 3-dimensional cortical and cancellous bone grafts was measured using the Mimics software. There were significant differences in all comparisons between the anterior and posterior iliac crest, except for volumes of cortical bone. More cancellous and total corticocancellous bone can be harvested from the posterior than the anterior iliac crest, together with similar or smaller volumes of cortical bone. Sex, but not age, is an important factor in terms of the amount of bone that can be harvested, with a wide range of volumes individually from both iliac crests.

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Distance-dependent accuracy in Le Fort I maxillary repositioning procedures

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It has been hypothesised that, in maxillary repositioning procedures, longer distances correlate with less accurate transfers and particularly the repositioning forces of facial skin and muscles that increase exponentially. However, this has not to our knowledge been confirmed. The purpose of this study was to search for differences in the accuracy of transfer from maxillary repositioning procedures parallel to the three orthogonal planes and with respect to three different anatomical landmarks of the first molar left and right (M1L and M1R) and the first incisor (I). Cone-beam computed tomography (CT) datasets taken before and after operation for 92 patients who had Le Fort I maxillary repositioning procedures were aligned to measure the changes in the maxillary position in the axial, sagittal, and transverse directions. Differences between planned distances and those achieved were calculated and analysed with Pearsons correlation coefficient. The strongest significant correlations between the extent of planned repositioning distances and achieved differences (error) were detected in the sagittal plane for the anatomical landmarks of the right (M1R) and left first molar (M1L). Correlations became weaker if a limited planned distance ranging from 0–4 mm was compared with a complete observed range that reached up to 12 mm. Our results show for the first time to our knowledge that the accuracy of transfer of wafer-based maxillary positioning procedures depends on the distance being moved. Longer distances correlate with less accuracy, particularly in the sagittal plane and in the first molar region.

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Success rates and complications of autologous onlay bone grafts and sinus lifts in patients with congenital hypodontia and after trauma

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Autogenous bone remains the gold standard for augmentation of the alveolar ridge in congenital hypodontia and appreciable post-traumatic deformity. This generally reflects the volume of material required for such defects and the osteogenic potential of the grafts. Morbidity at the donor site and success rates may lead to autogenous grafts being superseded by xenografts or alloplastic materials in the future, but we know of little evidence to confirm this. All patients having augmentation of the alveolar ridge or sinus lift to enable subsequent placement of implants between 01 January 2009 and 31 December 2016 were identified from a prospectively-gathered database held at the Queen Elizabeth Hospital, Birmingham. Morbidity was recorded, with overall success defined as a graft that enabled subsequent placement of an implant. During this period the following grafts: calvarial (n=4), iliac crest (n=4), and ramus (n=149) were recorded, as well as 53 sinus lifts. Sinus lift augmentation with BioOss® had the highest success rate (5153/). Calvarial and iliac crest grafts had higher failure rates (24/ and 34/, respectively) than those from the mandibular ramus (64% ,149/). Fifteen of 149 (10%) ramus grafts resulted in transient anaesthesia of the inferior alveolar nerve but no patients developed any permanent morbidity at the donor or recipient sites. Ramus grafts are a predictable method of bone augmentation with only transient morbidity at the donor site. Higher failure rates for extraoral grafts probably reflect their use in more challenging cases when more bone is required. Bilateral ramus grafts are an alternative to extraoral grafts and may be supplemented by bovine-derived particulate grafts with no appreciable increase in complications.

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Survival after surgery for oral cancer: a 30-year experience

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Oral squamous cell carcinoma is the most common intraoral malignancy, for which we advocate radical primary resection with adjuvant treatment where indicated. The main aims of this paper are to identify the overall survival of a consecutive series of patients and to relate survival to clinical and pathological factors. Kaplan–Meier curves were produced for site, sex, TNM status, and use of postoperative radiotherapy. The data were analysed using IBM SPSS Statistics for Windows and probabilities of less than 0.05 were accepted as significant. A total of 921 patients were recorded in the database with a diagnosis of oral squamous cell carcinoma out of a total of 1958 with salivary gland conditions or other cancers of the head and neck (43.1%). The earliest date of diagnosis was 1973, and the data were censored at 31 March 2016. The database comprised 340 women (36.9%) and 581 men (63.1%). A total of 339 patients died (34.5%): 117 women (33.7%) and 222 men (65.5%). The mean (range) age at death was 73.4 (31.4–97.5) years for women and 68.7 (33.3–95.5) years for men (t (337)=3.28, P=0.001). Our overall survival was somewhat better than the 56% fiveyear survival reported for oral cancer in England in 2010, which may be a reflection of the treatment. This work supports the view that aggressive management may improve overall survival.

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UK temporomandibular joint replacement database: a report on one-year outcomes

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Alloplastic temporomandibular joint (TMJ) replacements are increasingly subspecialised, and supraregional centres that treat sufficient numbers to ensure high standards are emerging. Having recently reported the introduction of a national TMJ joint replacement database that is endorsed by the British Association of TMJ Surgeons (BATS), we now present the first-year outcomes. This was a review of all data in the BATS National Case Registration of TMJ Replacement as of June 2014. A total of 252 one-year outcome records were available. Key outcomes were median (IQR) improvements in interincisal distance of 9 (4–15) mm (P< 0.001) and worst-sided pain score of 6 (4–8) (P <0.001). Pain scores improved or remained static at one year in all but 3 (2%) patients. There was a significant improvement in the proportion of patients who reported a good, very good, or outstanding quality of life at one year (38% at baseline to 87% at one year; P < 0.001). While outcome reports from single centres for alloplastic TMJ replacements have already been published in the United Kingdom, this is the first dedicated national database in this country that will yield valuable longitudinal follow-up data. Outcomes were comparable with smaller published series and showed improvements in pain, dietary intake, quality of life, and function, with few outliers. The database has recently moved to a new software system and we hope to publish three-year and five-year outcomes in due course.

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Changes in bite force after orthognathic surgical correction of mandibular prognathism: A systematic review

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Patients requesting treatment for mandibular prognathism seek functional and aesthetic improvements. Improvements in bite force and efficiency are generally used as measures of better function. It is unclear what effect the surgical correction of mandibular prognathism will have on the patient's occlusal forces. The literature was searched using medical subject heading (MeSH) and key word terms 'bite force', 'osteotomy', 'orthognathic surgery', and 'prognathism'. A total of 17 articles were included in this review. These included a total of 697 patients, who ranged in age from 15 to 44 years. Male patients outnumbered female patients in only one study. Five hundred and thirty-two patients underwent bilateral sagittal split osteotomy, 108 patients underwent intraoralvertical ramus osteotomy, and 24 patients underwentextraoral vertical ramus osteotomy (approach unspecified). In general, masticatory efficiency at 3 months after surgery was greater than that found pre-surgically; the increase was significant at 6 months after surgery. The occlusal contact area and points tended to increase from 3 months after surgery, and there was a significant increase at 12 months after surgery. Occlusal forces, although improved, will be lower in corrected prognathic patients than in normognathic patients even at 2 years after surgery.

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Computed tomography and anatomical measurements of critical sites for endosseous implants in the pterygomaxillary region: A cadaveric study

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The aim of this study was to obtain computed tomography (CT) and physical measurements of the pterygomaxillary region to determine the anatomical and radiographic landmarks that clinicians need for pterygoid implant placement. Seventy-eight hemi-heads with an atrophic posterior maxilla from 46 cadaveric samples were measured using CT. Twenty-one hemi-heads were selected randomly for physical measurements. CT measurements

showed that the mean and minimum distance between the maxillary tuberosity point (MT) and the most lateral lowest point of the pterygomaxillary fissure (PF) were 18.7 mm and 10.0 mm, respectively. The mean and minimum distance between the alveolar crest point passing the extended line of the infrazygomatic crest and the PF were 22.7 mm and 14.7 mm, respectively. The mean and minimum distance between the PF and the greater palatine canal were 2.9 mm and 0.2 mm, respectively. Physical measurements showed that the mean and minimum distances between the MT and the descending palatine artery (DPA) were 19.4 mm and 12.7 mm, respectively, and those between the PF and the DPA were 3.7 mm and 0.0 mm, respectively. The results confirmed considerable variation in the values of the pterygomaxillary region measured at the specific sites. Therefore, careful and sufficient consideration is required in each case of pterygoid implant placement.

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Recurrent dislocation: scientific evidence and management following a systematic review

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Recurrent mandibular dislocation is a rare condition that can have a negative impact on quality of life. Different surgical techniques are employed in the treatment of this condition, and the demand for maximum healthcare quality has contributed to the implementation of evidence-based clinical practice. The objective of this study was to determine the level of scientific evidence in articles reporting open surgical treatment for recurrent mandibular dislocation. A comprehensive search strategy was conducted to locate relevant articles in the PubMed and Web of Science databases on open surgical treatment for recurrent mandibular dislocation published between January 1974 and August 2014. These were classified into one of the five established levels/sublevels of evidence: the level of evidence was determined based on the classification proposed by the Oxford Centre for Evidence-Based Medicine. One hundred and fourteen articles were identified, 91 of which were excluded based on the eligibility criteria. Thus, 23 articles were selected for inclusion in the review. All of the selected articles were rated as level 4 (low quality) regarding the level of evidence. The present review revealed that articles on open surgical treatment for recurrent mandibular dislocation exhibit a low level of scientific evidence. Thus, further studies on this topic with greater methodological rigour are needed.

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Surgical resection and vascularized bone reconstruction in advanced stage medication-related osteonecrosis of the jaw

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A retrospective review of all patients with stage 3 medication-related osteonecrosis of the jaw (MRONJ), treated by surgical resection and immediate vascularized bone reconstruction at a tertiary care medical center, was performed. Eleven patients were included, seven female and four male; their mean age was 65.8 years (range 56–73 years). Mean follow-up was 25 months. Ten patients had received intravenous bisphosphonates. The most common pathology was breast cancer (411/). Pain (n=8) and pathological fracture (n=7) were the most common presenting symptoms. Microvascular free flaps consisted of seven fibula osteocutaneous flaps and four scapula osteocutaneous free flaps. All patients reported resolution of symptoms, with complete bone union identified radiographically (100%). Complications occurred in three patients (27%). One patient required removal of hardware at 8 months postoperative. Dental implant rehabilitation was completed in two patients. Ten patients are tolerating an oral diet. Ten patients are alive without evidence of MRONJ at any of the surgical sites. One patient died 28 months after surgery from progression of metastatic disease. Advanced MRONJ can be successfully treated in patients using vascularized tissue transfer, including those patients with significant peripheral vascular disease. Dental rehabilitation is a viable option for advanced MRONJ patients treated by vascularized flap reconstruction.

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3-D computed tomography measurement of mandibular growth after costochondral grafting in growing children with temporomandibular joint ankylosis and jaw deformity

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Objective: The aim of this study was to evaluate the long-term results after costochondral grafting (CCG) in growing children with temporomandibular joint ankylosis and jaw deformity by 3-dimensional computed tomography (CT) measurement.

Study design: Patients with unilateral TMJ ankylosis and jaw deformity treated by CCG from 2010 to 2014 were evaluated. Their CT data within 1 week after operation and after at least 2 years of follow-up were analyzed using ProPlan CMF 1.4 software. Maximal incisal opening (MIO), condyle–ramus heights, chin deviation, and growth

of CCG were measured and compared before and after the operation and at the last follow-up. SPSS 17.0 software was used for statistical analysis.

Results: Seven patients were included in the study. The mean follow-up period was 46.4 months. Five of 7 patients treated with this protocol experienced good mouth opening and symmetric mandibular growth. One patient achieved good mouth opening but not symmetric growth, and 1 patient experienced ankylosis again.

Conclusions: CCG can be a reliable method to treat temporomandibular joint ankylosis with jaw deformity in growing children. Continued growth occurs in the children, but long-term outcomes require further investigation.

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Comparative analysis of imaging techniques for diagnostic accuracy of peri-implant bone defects: A meta-analysis

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Objective: The aim of this study was to systematically review the literature regarding diagnostic accuracy of imaging techniques in detecting peri-implant bone defects.

Study design: The search was performed in 8 electronic databases from April to May 2016 and updated in September 2016. Studies that assessed imaging techniques to detect peri-implant bone defects were analyzed.

Results: The search yielded 680 articles published from 1991 to 2016. Of these, 12 studies were considered eligible for this review. The selected studies evaluated the use of cone beam computed tomography (CBCT), intraoral radiography (IR), computed tomography, and panoramic radiography. The sensitivity for CBCT was 59%, whereas the specificity was 67%. For IR, the sensitivity was 60%, and the specificity was 59%. Area under the curve values in receiver operating characteristic (ROC) analysis were 69% for CBCT and 63% for IR. For CBCT, the highest value for positive predictive value was 0.94, negative predictive value was 0.98, positive likelihood ratio was 21.3, and negative likelihood ratio was 1.28. For IR, the highest positive predictive value was 1.0, negative predictive value 1.0, positive likelihood ratio 50.0, and negative likelihood ratio 0.70. The highest diagnostic odds ratio was 80 for CBCT and 4.45 for IR. No conclusion could be drawn for additional techniques.

Conclusions: Both CBCT and IR showed a clinically acceptable performance for assessing peri-implant bone defects.

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Is cone beam computed tomography accurate for postoperative evaluation of implants? An in vitro study

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Objective: The aim of this study was to evaluate the accuracy of cone beam computed tomography (CBCT) for evaluation of the bone–implant interface in comparison with periapical radiography.

Study design: Titanium implants were inserted in 74 bovine rib blocks in intimate contact with bone walls and with a gap of 0.125 mm (simulating failure in the osseointegration process). Periapical radiographs were taken with conventional film, and CBCT scans were acquired with i-CAT (0.2 mm and 0.125 mm voxel) and Kodak (0.2 mm and 0.076 mm voxel) units. Three examiners evaluated the images using a 5-point scale. Diagnostic accuracy was analyzed through sensitivity, specificity, and the area under the receiver operating characteristic (ROC) curve (AUC) with 95% confidence intervals (CIs). Intra- and interexaminer agreements were analyzed through Kendall's concordance test.

Results: Intra- and interexaminer agreements showed satisfactory results. The greatest accuracy was observed with conventional radiography (AUC=0.963; CI 95% =0.8910.993-). I-CAT 0.125-mm images showed good accuracy (AUC=0.885; CI 95%=0.7900.947-), with no significant difference compared with conventional radiography. Kodak images had high specificity and low sensitivity, presenting more false-negative results.

Conclusions: Conventional radiography showed the highest accuracy for assessment of the bone–implant interface. However, CBCT (i-CAT; 0.125-mm voxel), if available or if performed for preoperative assessment of another implant site, may provide similar accuracy.

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