

Systematic Review Paper Trauma

The effect of treatment timing on the management of facial fractures: a systematic review

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M. J. L. Hurrell, M. D. Batstone: *The effect of treatment timing on the management of facial fractures: a systematic review.* Int. J. Oral Maxillofac. Surg. 2014; 43: 944–950. © 2014 International Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Abstract. The ideal timing for treatment of facial fractures has not been well established. The objective of this systematic review was to examine the effects of treatment delay on outcome in the management of facial fractures. The PubMed database was used to search for relevant English-language articles published between 1979 and 2013. Cross-referencing identified additional studies. There were no selection restrictions for study type. The first author, using pre-defined data fields, extracted information independently. Studies were assessed by study type, evidence level, sample size, data collected, outcome variables, control of confounding variables, and findings. Thirty studies were identified. Inconsistency was identified with data collected, outcome variables, and findings. Of the 30 studies identified, 28 were case series, thereby providing a low level of evidence overall. The majority of case series were retrospective and sample sizes were predominantly small. Control of confounding variables was poor. Eighteen studies found no statistically significant relationship between treatment delay and treatment outcome. Nine studies found a statistically significant relationship between treatment delay and worse treatment outcomes. There were three studies with conflicting results. With the current body of evidence, definitive conclusions cannot be drawn on the timing of treatment for facial fractures.

Key words: delay; timing; facial; fracture; outcome; treatment.

Accepted for publication 4 March 2014
Available online 2 April 2014

Facial fractures are a common presentation to hospitals worldwide. Their treatment has evolved dramatically in recent decades, particularly since the introduction of open reduction and internal fixation. However, many uncertainties remain. The relevance of delay from injury to treatment is commonly disputed amongst surgeons and in the literature. Intuitively, delaying the treatment of facial fractures could increase the risk of infection, the

likelihood of technical difficulties, and the discomfort experienced by patients. For these reasons, treatment delay has historically been minimized where possible. Prominent surgeons such as Champy,¹ Cawood,² and Maloney^{3,4} have previously advocated delays from injury to surgery of no more than 24, 48, and 72 h, respectively. However, there are many reasons why delay beyond 72 h may be practical or unavoidable. Managing facial fractures

usually involves the administration of a general anaesthetic, surgery, a hospital stay, and a rehabilitation period. Due to the multifactorial nature of the management process, outcomes may be affected by a multitude of factors. Patient factors such as age, medical co-morbidities, mental history, compliance, concomitant injuries, and financial status may be relevant. Additionally, health system factors such as inter-hospital transfer policies, funding, resource

allocation, staff training, and availability have an impact.

This systematic review aims to examine broadly the effects of treatment delay on outcomes in the management of facial fractures, by identifying studies of any type that have examined the effects of timing of treatment on outcomes of any type, in the treatment of fractures of the human facial skeleton by widely accepted treatment methods.

Should it be found that treatment timing significantly alters the outcome of facial fracture management, new protocols and recommendations could be proposed. Conversely, a poor correlation may further justify the planning of facial fracture management in accordance with the conveniences of the relevant health care system.

Materials and methods

Studies of any type that examined the effects of timing of treatment on outcomes of any type, in the treatment of fractures of the human facial skeleton by widely accepted treatment methods, were reviewed (Fig. 1). There were no restrictions imposed for participant selection or

length of follow-up. Studies dated prior to 1979 were excluded due to the considerable differences in surgical and medical methods of management employed before this time. Studies were assessed by study type, evidence level, sample size, data collected, outcome variables, control of confounding variables, and findings.

The search for studies was developed and conducted by the first author. Studies were identified by an electronic search of the PubMed database from 1 February to 1 April 2013. In addition, cross-referencing was utilized – the reference lists of the studies identified in the preliminary search were checked for additional suitable studies.

Search terms for the preliminary search included the following: facial, fracture, treatment, management, outcome, mandible, maxilla, zygoma, orbit, frontal, nasal, delay, and timing.

An eligibility assessment was performed independently in an un-blinded manner by the first author. Studies were identified as relevant by title and abstract. After identification, full text publications were sourced. The first author reviewed the full text publication of every identified study to determine relevance with respect

to the aforementioned pre-determined assessments. Every type of study that was relevant was included; study type was analyzed in the systematic review assessment. Full text publications were available for all identified studies, from both the preliminary search and the cross-referencing process.

Methods for assessing the risk of bias in individual studies were largely deemed impractical by the authors, due to the paucity of quality studies identified. Methods of control of confounding variables were identified and recorded for each study by the first author. Bias and confounding in relation to this systematic review were deliberated further in the discussion.

Results

A total of 30 studies were determined to be relevant for inclusion in the systematic review. The preliminary search of the PubMed database yielded more than 1000 studies. After excluding non-English studies, the remainder were screened by title and abstract. Seventy-eight full text publications were obtained and assessed for inclusion by the first author, with 54 studies being discarded as non-relevant. Six additional studies^{3,5–9} were identified and included from the cross-referencing process.

Study type

Thirty studies were identified, including one systematic review,¹⁰ one prospective randomized controlled trial (RCT),¹¹ and 28 case series.^{3–9,12–32}

Evidence level

The RCT was randomized prospectively for administration of antibiotic therapy. However, the effect of delay was evaluated retrospectively.¹¹

The systematic review included in its analysis the aforementioned RCT by Chole and Yee.^{10,11} However, it was not interpreted as an RCT with respect to treatment delay.¹⁰ In addition to the RCT, Hermund et al.¹⁰ identified only five studies for the systematic review that allowed for statistical analysis. Furthermore, Hermund et al.¹⁰ stated that none of the studies allowed for a stratified analysis to control for “confounding factors such as severity of fracture, number of fractures, alcohol or drug abuse, non-compliance or treatment delay because of an already existing infection being neglected by the patient”.

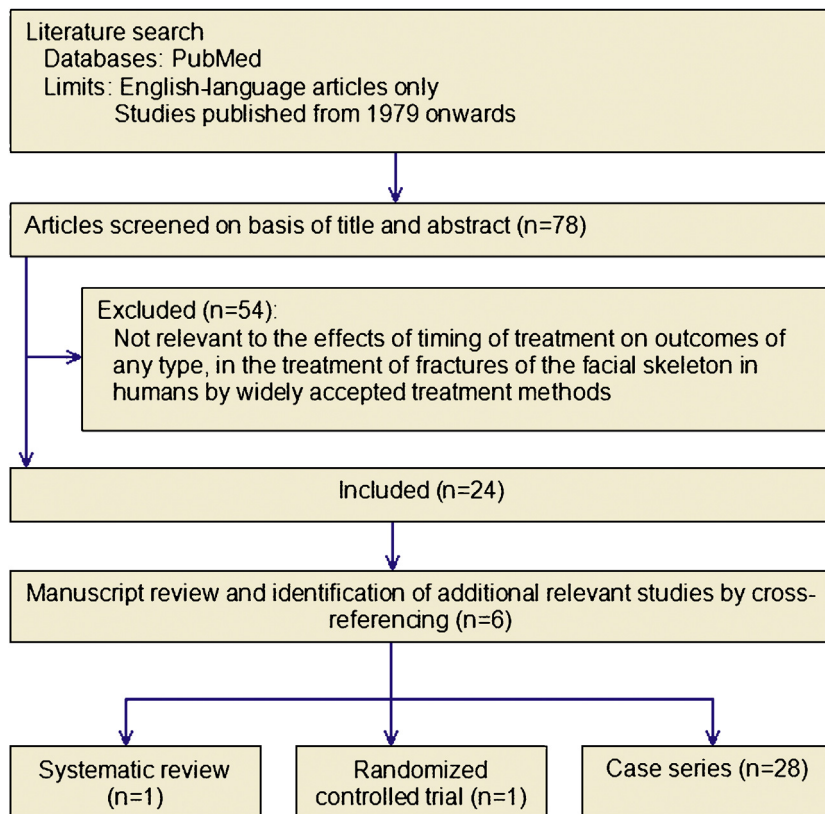


Fig. 1. Flow diagram of study selection.

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