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REVIEW

Is there an ideal outcome scoring system for facial reanimation surgery? A review of current methods and suggestions for future publications



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Summary Facial reanimation is the surgical process of attempting to restore dynamic, spontaneous symmetry to the paralysed face. We undertook to review the most frequently used scoring systems and discuss a universal set of assessments which every facial palsy surgeon can use to standardize the outcome of surgical intervention and allow a comparison to be drawn when comparing different operative techniques. A literature review was performed using PubMed and Cochrane databases to identify scoring systems for facial palsy, facial nerve regeneration and facial reanimation. The scoring systems were broken down into the following broad categories: observational, mathematical and computer-graphical measurements. More than 20 scoring systems were identified and included in the study. The scoring systems were analysed and assessed for reproducibility and inter-observer reliability. The current trend in the literature is to use the House–Brackmann Score due to its historical longevity, brevity and ease of understanding. However, this was never designed to assess outcomes of facial reanimation and there are clear limitations. Other more appropriate methods such as 3-D facial analysis are prohibitively expensive to widely implement. The quest continues to develop an ideal system. From this review it is clear that a quick, simple to use system should be used which incorporates the patient's own views. Therefore a combination of pre- and post-operative photographs of the patient should be assessed by an independent panel as well as the patient. We propose a universal set of photographs that can be used to standardize the outcome of surgical intervention when publishing results in the literature. This will allow a comparison to be drawn when comparing different operative

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techniques and help surgeons work collectively towards the same goal while improving patient outcomes.

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Introduction

Facial reanimation is the surgical process of attempting to restore dynamic, spontaneous symmetry to the paralysed face. Frequently this is achieved by using one muscle, either through free functional muscle transfer or local muscle transposition to mimic the function of the 17 muscles of facial expression. Understandably the results obtained are extremely variable, not only between patients undergoing the same technique but also those whom have had different methods of reanimation. Outcomes are dependent on the type of muscle used, the selection of donor nerves, the ability of the nerve to regenerate as well as a range of patient factors, aetiology of the palsy and surgical technique.

Multiple factors must be addressed when planning reanimation surgery. Considerations such as age, anatomy, aetiology and previous interventions result in a tailored approach to each individual which means that irrespective of the type of treatment selected it is almost impossible for a true accurate outcome measure to be formulated. Recent discussions at the 12th International Facial Nerve Symposium¹ have highlighted the need for a standardized outcome measure when discussing the surgical outcomes in this patient group.

Although facial reanimation techniques have evolved to address the many aspects of facial palsy, no universally accepted grading system exists to measure the outcomes of surgery. The difficulty lies in developing an objective, easily reproducible system that is able to assess surgical outcome in a clinical setting and at the same time have significant rigor to be applied to research. It also needs to be able to monitor clinical improvement over time and to be applied to both primary and secondary facial nerve dysfunction.

Within the literature the scoring systems can be broken down into two broad categories: subjective and objective. This review aims to summarise and compare current grading systems used to quantify facial nerve function as well as discussing the senior author's approach which has developed over many years of practice in the field of facial reanimation.

Methodology

A Pubmed and Cochrane centred database literature review was performed using search terms aimed at named scoring systems in facial palsy, facial nerve regeneration and facial reanimation. Values for quoted reproducibility, reliability and sensitivity were extrapolated directly from articles analysing and comparing individual grading systems. Statistical significance was based on the reviewed articles'

own statistical analysis and data that did not meet sufficient significance ($p > 0.05$) was not included in this review. The final approach for grading facial palsy and surgical outcome is based on Level IV evidence, directly from experience of surgeons that perform facial reanimation surgery both at the Royal Free Hospital and previously at Mount Vernon Hospital.

Subjective methods

Historically facial nerve scoring systems relied fully on the clinical assessor to subjectively grade the gross function of a patient's facial nerve. In 1983, House classified early grading systems into gross scales, regional scales and objective analysis of facial movement.² In his publication an independent panel of 15 otologists ranked, in order of severity, the facial nerve palsy of 12 patients using the different scales. He found that the regional scales analysed (Janssen scale,³ Smith Scale, Adour and Swanson Scale of Facial Paralysis Recovery Profile⁴ and Yanagihara Scale⁵) showed the highest degree of reliability, but also a wide range of intraobserver variability. He also found that the objective Stennert Scale,⁶ which replaced sequential grading of severity with an absent/present scale for clinical features of facial nerve paralysis was both unreliable and not reproducible. He concluded that although the less detailed gross scales such as the Botman and Jongkees,⁷ May Scale⁸ and the Pieterse Scale,⁹ were generally less reliable than regional scales, they were reproducible and showed the least amount of inter-observer variation. These findings allowed House to put forward his own gross facial nerve grading system, categorising patients into six groups ranging from normal to total paralysis. He also included secondary facial nerve defects that contribute to the overall disfigurement in his assessment. This scale was further developed into the House–Brackmann Scale (HBS)¹⁰ (Table 1), which is widely used today for scoring facial nerve disability and remains in use in scoring facial paralysis and recovery as well as being more recently adapted to monitor facial reanimation outcomes – a feature it was not originally designed to assess. Since its endorsement by the American Academy of Otolaryngology, the HBS has been subject to criticism. Its subjective nature and ambiguity of secondary defect classification is prone to high inter-observer variability (variations were found depending on the observer's experience) and the scale is not sensitive enough to distinguish between clinically significant changes in patient's symptoms.^{11–16} The main criticism is directed at the fact that HBS does not fully communicate facial function and a more representative score is achieved if the HBS is applied to the forehead, eyes, nose and mouth individually.^{11,17}

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