Evaluating societal outcomes of orthognathic surgery: an innovative application of the Social Return on Investment methodology to patients after orthognathic treatment

Abstract

Patient outcomes of orthognathic treatment are complex and include physical changes, mental and physical health improvements, and psychosocial adjustments. Investigations of the personal and societal impact of orthognathic treatment using the government recognised Social Return on Investment (SROI) framework have not previously been undertaken. A study was designed focusing on the first two stages of the six-stage SROI model in order to begin to understand the wider nature of changes associated with orthognathic treatment experienced by post-operative patients. Data collection took place with participants (n = 16) via two qualitative storyboard workshops which investigated participants' perceptions and experiences concerning the short, medium and longer term outcomes of orthognathic treatment. A grounded theory-SROI methodology was used to explore the participant stories via a process of constant comparison whereby data were analysed for concepts and organised into distinct themes. This produced a theory of change which articulated the short-to-medium and longer term outcomes of orthognathic treatment. The theory of change captured a number of outcomes and demonstrated the utility of employing an SROI framework to investigate wider psychosocial changes associated with orthognathic treatment. It provides a basis on which to develop potential indicators to assess, and potentially value, these outcomes over time. This study represents an innovative approach that helps articulate patient-defined outcomes. The application of the findings to patient selection, engagement and post-operative care is briefly discussed.

Introduction

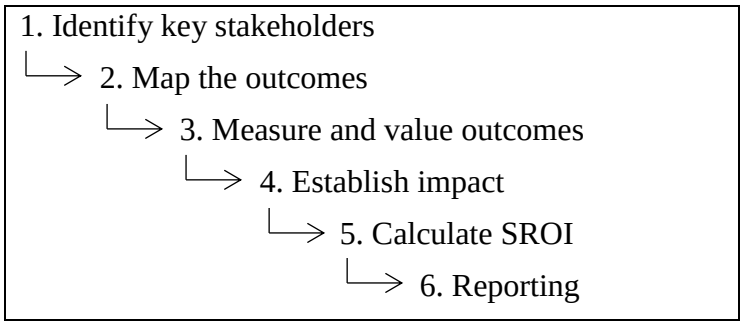
Patients are motivated to undergo orthognathic treatment to address dentofacial deformities for a number of reasons, including functional improvements, changes in appearance, and a range of psychological and social goals.[1,2,3,4] The positive effects of orthognathic treatment on quality of life (QOL) and psychosocial status after surgery status are broadly accepted.[5,6,7,8] The success of an intervention can be assessed via patient feedback concerning the outcomes of treatment[9] and these have commonly been assessed using QOL tools and those specific to surgical outcomes.[1,10,11] However, studies of the wider societal value created in aspects of medicine, including orthognathic treatment have not been conducted before and provide a further means of understanding what surgical success looks like. This might be attributable to SROI being an essentially emergent methodology that has largely emerged through praxis[12] and a focus on models assessing the cost-effectiveness of interventions which overlook wider social outcomes. In contrast, exploring and valuing the broader outcomes of orthognathic treatment gives credence to the multifaceted and overlapping dertiminants of health which are enmeshed within a range of social, political, personal and interpersonal, and economic factors[13,14] and helps develop a more nuanced account of its impact. Applying a methodology that seeks to explore and assess wider societal value therefore provides a means of establishing a deeper understanding of patient outcomes which speaks directly to the contextual complexities of patients' lives. The aim of the study was to begin to understand the wider nature of changes associated with orthognathic treatment experienced by patients.

Patients, material, and methods

A Social Return on Investment (SROI) methodology was deployed to investigate the wider social outcomes associated with orthognathic treatment for post-operative patients. Social

Return on Investment is a government-recognised methodology that measures and accounts for the broader concept of value and measures change in ways that are relevant to the people or organisations that experience or contribute to it.[15] As a six-stage methodology (Figure 1) SROI has most frequently been promoted as a way of enabling social enterprises to quantify the value of impacts and translate them into monetary values in order to understand how they make a difference.[16,17,18] The process involves generating theory from peoples' experiences which is then used to identify, select and deploy a range of measures to quantitatively assess changes over time across multiple social- ecological domains. These changes can be valued and in doing so establish a ratio of social return on investment which reflect the broader social- ecological context. However, the conceptual aspects of the framework are often underplayed, largely due to a lack of appropriate theoretical grounding. As a co-produced and outcomes-focused framework, SROI seeks to involve stakeholders for example, patients and professionals delivering care at every stage of the research process to gain a full understanding of the wider benefits to society of a given intervention, programme or service.[18,19] Its utility within the current setting has yet to be explored and so, as a pilot study, the research was primarily concerned with exploring the first two stages of the SROI methodology; identify key stakeholders and map outcomes. This intentional restriction was applied as a means of exploring the feasibility of the methodology within the orthognathic treatment setting with a view to developing an initial theory derived from patients' experiences. Two members of the research team are experienced in the development and implementation of SROI approaches and the process of analysis and assessment of outcomes.

Figure 1: Six stages of SROI



Patients were targeted who had undergone uncomplicated single or double jaw orthognathic surgery, at least 6 months previously, by a single surgeon, from a single hospital in the South West UK, for non-syndromic dentofacial deformity. In total, 20 consecutive research participants were identified purposively by the research team of which 12 patients (60%) were available to take part in one of two data collection workshops, in addition to four family members. Surgical staff did not participate in the workshops so as to avoid the potential of influencing patient responses. Participants were between six and eighteen months post-operation. Prior to initiation the study was approved by the NHS Research Ethics Committee. Invitations, patient information sheets and voluntary informed consent were sent directly to all patients via post or email to those who consented to take part in the research. Patients were able to discuss the research with surgical staff prior to consenting to take part. The non-involvement of other stakeholders for example, surgical staff, is a limitation which is highlighted in the discussion below.

Data collection took place via two qualitative workshops during which participants completed a paper-based journey of change template that captured data concerning the short, medium and longer term outcomes of orthognathic treatment, and factors that facilitated or prevented these being achieved. Patients were aged between 20-30yrs (mean age = 23.4), of which males and females were evenly split. The journey of change exercise intentionally

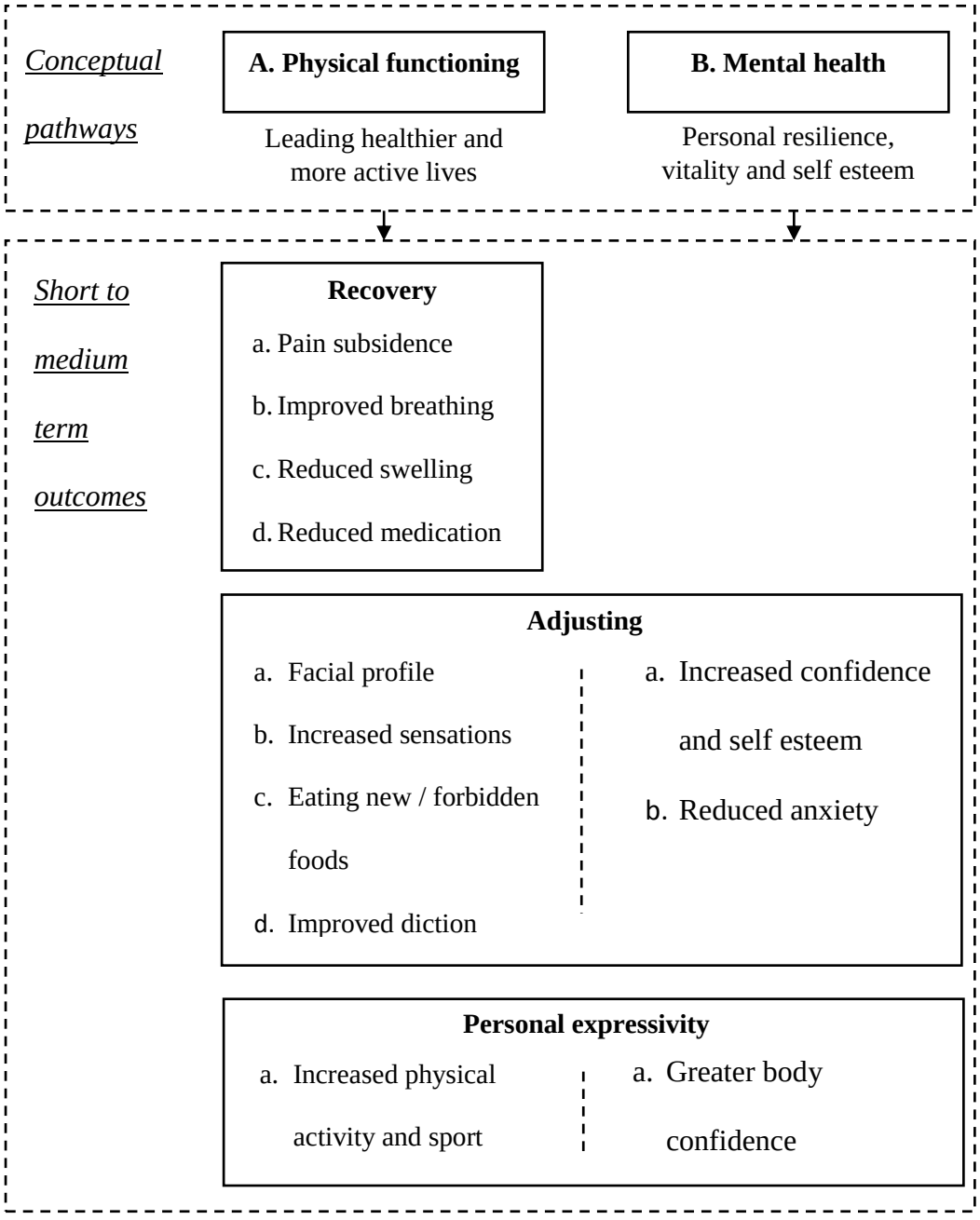
sought to identify and explore causal linkages between a range of patient-identified outcomes and contextual factors, and in doing so established a chronological 'journey' which patients went along. The product of the exercise was a diagrammatic theory of change which articulated the short, medium and longer term outcomes of orthognathic treatment, and factors that facilitated or prevented these being achieved, with which the researchers were able to assess patient progress. To support the process discussions between participants were facilitated by the research team and were recorded and transcribed verbatim. Data from family members (25%, n = 4, family members including parents and a sibling) were included to provide an additional perspective and to assist in the articulation of outcomes experienced by patients.

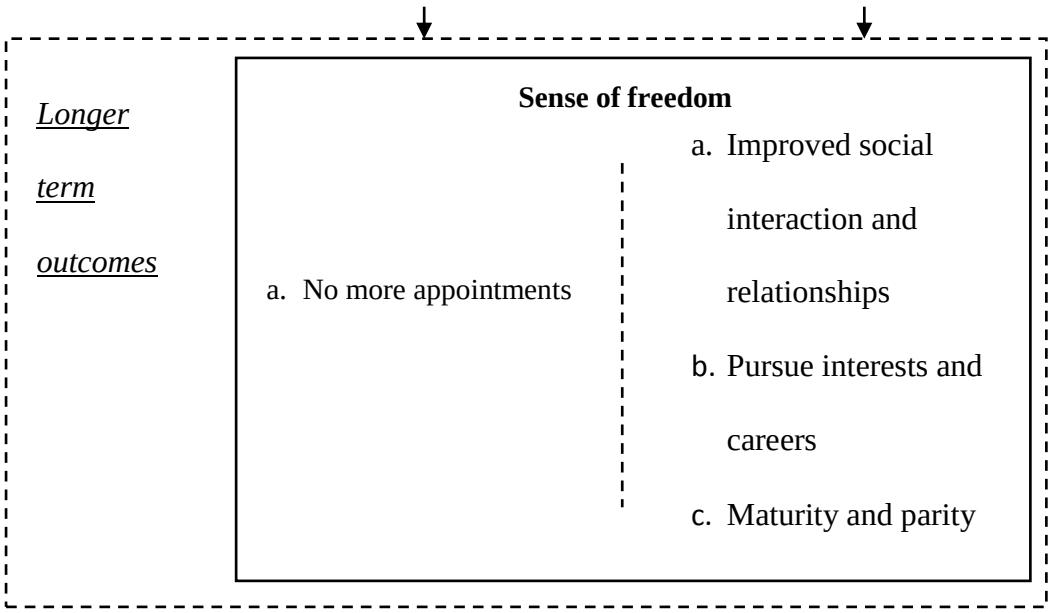
Data were analysed using a grounded theory-SROI methodology.[12] Grounded theory is a systematic methodology[20,21] that helps researchers develop theories about social phenomena by establishing theoretical statements about causal relationships within subjective individual experiences.[22] The analysis involves coding data into initial themes which become increasingly theoretical via a process of constant comparison whereby data is compared and refined in an iterative manner to assist with the conceptualisation and categorisation of data. Data were managed and analysed using NVivo 12 to assist with the objective of generating detailed knowledge capable of explaining the perceived changes that had occurred or were occurring as a consequence of the treatment process. The product of this process was a conceptual model that articulated the wider nature of outcomes associated with orthognathic treatment.

Results

The theory of change highlighted the outcomes articulated by participants principally unfolded across two interrelated conceptual pathways, along which the short-to-medium term and longer term outcomes were located (Figure 2). The outcomes were theoretically overlapping and interrelated, reflecting the complexity of contexts in which they were located. Each outcome included a number of sub-themes and associated dimensions which helped unpack the data. Table 1 provides a summary of extracts taken directly from the transcriptions and are provided using participant pseudonyms (e.g. NT).

Figure 2: Theory of Change





Physical Functioning related to patient's perceived abilities to lead to them living healthier and more active lives. Short to medium term outcomes included recovery, adjusting and personal expressivity. Reflecting the temporal and dynamic outcomes processes, some patients indicated that they needed more time than others before these outcomes were achieved. A paradoxical situation was noted in which patients found themselves feeling largely the same within themselves as before surgery, but at the same time being confronted with a new and evolving post-operative physical appearance that challenged their sense of identity. The ability to consume new and previously forbidden foods was a significant motivation for treatment for some patients which also transformed family gatherings and meals out. Confidence to engage in new activities was expressed through increased participation in, and enjoyment of, physical activity and sport. Longer term, a greater sense of freedom related to the increased ability of patients to go about their lives without feeling tied to a treatment-related appointments schedule, which was particularly important as participants transitioned into adulthood and wished to pursue their own interests. Similarly,

parents and siblings were liberated from the need to prepare for travel and time off work, and the emotional stress of supporting family members (Table 1).

Table 1: Summary of extracts

Pathway A: Physical Functioning
'I'm definitely eating more healthily, before it was a lot of liquid foods, we were making things that were convenient. I think my diet is much improved, there's much more variation which wasn't the case before' [NT].
'Growing up, you associate your appearance with your identity so when that changes suddenly you have to step back and readjust, so for me it was about adjusting to that change, which is a slow process. You realize you're the same person but that you look a bit different' [BB].
'…because I can breathe better at night it's improved things, I feel less tired, I have more energy during the day, I can do more things and get out more. I'm more focused now, and less grumpy, and I think generally better at my job' [NT].
Pathway B: Mental Health
'I had my braces off later in the year [just after starting University] and I was feeling more confident. Whereas, before I had my braces off I didn't feel so confident, I felt people were judging, I wasn't on a par. Now I'm more confident with job interviews,

photographs. Before when I smiled in photographs it didn't look like a smile, it didn't look right, now it looks like a happy smile. So I've more confidence in myself' [AP].

'Before, I'd be really self-conscious, I'd always cover my mouth when I was speaking to people, and I kind of limited what I would say, or if someone approached me I didn't really want to interact with them. Now I've overcome that, I just feel kind of normal, I guess. Now I can smile without thinking about it…' [NT].

'…it was about self-respect; like I should be doing these things because I deserve it. Things like general health and fitness' [CC].

'I didn't necessarily notice being more confident but my peers, friends and family certainly commented on how I was, I came across more confident to them … but I do feel more confident speaking to people I don't know without having to shy away. It feels more natural' [DD].

'I was in the same job for ages where everyone knew me and I felt really comfortable. But, obviously, I was really conscious about my jaw, but after the surgery I was really confident. Literally, weeks after I was changed drastically, and I wanted a new job, I wanted a change and I had the confidence to go for the interviews' [IW].

'…you just want to walk down the street and not feel that people are judging you. To just be like everybody else, be mainstream like everybody else. Not be different, not categorised as something else' [MU].

Pathway B: Mental health

Mental health related to the impact of treatment on participants' personal resilience, vitality and self-esteem with respect to feeling less anxious, more confident and better able to deal with challenges. Short to medium term outcomes included adjusting, reduced anxiety and personal expressivity. The majority of patients described the psychological outcomes of treatment including increased confidence and self-esteem, and reduced anxiety concerning negative or challenging thoughts that they had about themselves because of their appearance. Family members noted the difference in patients, particularly at family gatherings or special occasions where photographs were being taken, with patients gaining confidence and behaving without a sense of inhibition. This was also evident in an increased sense of freedom to engage in social situations and relationships without the feeling of being judged, as well as a renewal of interests and careers aspirations.

A number of barriers and facilitators were conceptualised during the data analysis process which helped contextualise patients' journeys following surgery and identified issues which might promote or hinder the achievement of outcomes. Facilitating factors included family and peer support, and external recognition of the physical impact of surgery. These were an important source of encouragement and motivation that helped patients come to terms with the challenges and impacts of the procedures. The journey was often a deeply personal one and the care and support of others provided a crucial safety net and source of emotional support and validation. Barriers included a lack of information and understanding, concern regarding the procedure and its consequences, and the notion of expert control. Not feeling sufficiently informed about various aspects of the procedures and its effects led to feelings of anxiety for patients and their families, including not fully understanding the recovery process and how best to manage it, for example in terms of diet and nutrition.

Consequently, patients and their families sometimes felt that they lacked decision making power in respect of how they went about the various aspects of the surgical process.

Discussion

The findings in this study are underpinned by stories of outcome change experienced by orthognathic patients and family members. They demonstrate the utility of using an SROI approach to investigate the wider psychosocial value of changes associated with orthognathic treatment and to develop potential indicators of change over time. The results broadly reflect existing research which has reported improvements in quality of life and psychosocial status[5,8,23] and factors which facilitate or present barriers within the surgical journey.[24] While existing research has demonstrated the efficacy of orthognathic treatment for a range of psychological, social, cosmetic and functional outcomes, it has failed to capture the value of this to individuals and wider society. This study builds on the existing evidence by applying an innovative methodology that locates data within an initial framework that intentionally seeks to value the outcomes of orthognathic treatment perceived by patients. The use of participant stories to explore and map these outcomes provides the first tentative step towards an economic assessment of the impact of treatment, both through cost savings to the state - for example, through avoided medical consultation costs - and the wider social value generated through, for example, improved well-being and self-confidence. By applying the first two stages of the SROI framework this study has demonstrated its utility as a methodology for engaging meaningfully with patients in order to understand and articulate their post-operative journeys. This should be of interest to surgeons and health care commissioners alike as a means of engaging patients at the start, throughout treatment and during post-operative care. A better understanding of the expected outcomes could not only

help engage patients in a more rounded treatment process but also provide more targeted and effective post-operative care. Likewise, an appreciation of the barriers to achieving such outcomes has implications for the design of management and information systems relating to orthognathic treatment, including that relating to patient selection guidelines and procedures.

While the present study marks the first of its kind it represents only an initial exploratory investigation of the wider societal value of orthognathic treatment. The intention is to develop further research that builds on the societal perspective acquired here within an approach that applies all six stages of the SROI methodology with a view to developing indicators that allow for the measurement and valuation of outcomes. Additional research has the potential to demonstrate the impact of orthognathic treatment across multiple ecological contexts and in doing so provide an advanced understanding that is of use to researchers and practitioners alike. An important first step is to undertake further journey of change exercises with a view to refining and building on the present data to ensure the accuracy and relevance of the theory of change with patients and other stakeholders.

The findings are limited by the small sample size and enlarging the sample to establish a more diverse stakeholder cohort will help develop and refine the theory of change and the nature of outcomes. Whilst the methodology seeks to include a full range of stakeholders, due to limitations of time and practical issues we were unable to include additional participants in the workshops. Further research will seek to include for example, surgical staff in similar workshops so as to elicit additional perspectives and experiences, and greater exploration of additional factors for example, malocclusion type. Further, it is not known what effect fixed appliance treatment had on patients' perceptions that were earlier in the post-operative phase and future research might usefully explore these aspects in addition to including a pre-operative cohort. As an interpretive methodology, the grounded theory-SROI approach offers a means of using rich description and theory-building to explore the

sociocultural and situated[25] dimensions of orthognathic treatment outcomes. In turn, this provides the foundation for the implementation of a full SROI that includes a value for money assessment.

Conflict of interest

No conflicts of interests are declared.

Ethics statement/confirmation of patients' permission

Research ethics were approved by the Health Research Authority (South West) Research Ethics Committee (ID: 16/SW/0166).

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