Early treatment for Class II Division 1 malocclusion with the twin-block appliance: a multi-center, randomized, controlled trial


Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The objective was to assess the effectiveness and cost of early versus adolescent orthodontic treatment of Class II Division I malocclusion. The authors concluded that early treatment produced no advantage over adolescent treatment, while the cost to the patient was greater. The methodology appears to have been appropriate and, on the whole, was clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to assess the effectiveness and cost of early versus adolescent orthodontic treatment of Class II Division I malocclusion.

Interventions
Early treatment was provided in two phases: the first was done when the child was in transition from first to permanent teeth, followed by a period of inactivity, followed by a final course of treatment when most or all of the permanent teeth were established. Adolescent treatment was provided in one stage when most or all of the permanent teeth were established.

Location/setting
UK/hospital.

Methods
Analytical approach:
The effectiveness data were derived from a single clinical study. The time horizon was until the patient had completed treatment. The authors stated that two perspectives were adopted, that of the health care provider and that of the patient.

Effectiveness data:
The effectiveness data were derived from a randomised controlled trial, which included fourteen hospital-based orthodontic specialists. There were 174 patients, who were enrolled between March 1997 and August 1999, and 89 were allocated to early treatment and 85 to adolescent treatment. Patients were followed up until their final appliances were removed. The number of patients who completed treatment was 54 in the early treatment group and 73 in the adolescent group. There were some differences between the two groups in the appliances used. The primary measures included: the relationship of the maxilla to the mandible measured by the Pancherz analysis (Pg/OLp minus A/OLp); the final overjet derived from the Pancherz analysis; and the final peer assessment rating.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The main measures of benefit were the relationship of the maxilla to the mandible, the overjet, the peer assessment
rating, and the Piers-Harris Children’s Self-Concept Scale score.

Cost data:
The direct costs included those relating to treatment, while the indirect costs were the travel and time costs of the patient when accessing treatment. The resource use data were from the clinical trial and the unit costs were from the Department of Health reference cost database. Time costs were based on the national average pay per hour from the Office for National Statistics. The price year was 2005 to 2006 and costs were discounted at an annual rate of 3.5%. The costs were estimated in UK pounds sterling (£) and converted to US dollars ($) using the purchasing power parity rates for 2005 to 2006.

Analysis of uncertainty:
There was no analysis of uncertainty.

Results
There were no significant differences between the early and adolescent treatment groups in any of the outcomes. For example, the overjet decreased from 10.77 to 4.33 in the early treatment group, and from 10.30 to 3.37 in the adolescent group, a final difference of 0.96 (95% CI 0.31 to 1.61), and the peer assessment rating decreased from 31.91 to 10.25 in the early group and 32.55 to 6.30 in the adolescent group.

The average cost of treatment in the early group was $3,913 compared with $3,018 in the adolescent group.

Authors’ conclusions
The authors concluded that early treatment produced no advantage over adolescent treatment, while the cost to the patient was greater with early treatment.

CRD commentary
Interventions:
The interventions were well described and appear to have been the appropriate interventions in the authors’ setting.

Effectiveness/benefits:
The effectiveness data were derived from a randomised controlled trial, which should have ensured a high degree of internal validity. Power calculations were performed to ensure that the size of the study sample was adequate. Details of the trial, including the method of randomisation and loss to follow-up, were reported, but further details of the baseline characteristics of the two study groups could have been provided. The authors noted that there were differences between the two groups in the appliances used, but they did not appear to control for these differences in the subsequent analysis.

Costs:
The cost categories appeared to reflect the perspective stated. The sources used for the resource quantities and unit costs were reported and appear to have been valid. Adjustments for the price year and discounting were reported.

Analysis and results:
No synthesis of the effectiveness and cost data was performed so, in effect, a cost-consequence analysis was performed. The results of the study were clearly reported and the authors compared their findings with those from other studies which, in general, were similar.

Concluding remarks:
The methodology appears to have been appropriate and, on the whole, was clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.

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