Healthcare Improvement Scotland | SHTG Advice on health technologies

Plain Language Summary

Chest wall bracing for children and young people with pectus carinatum

SHTG Assessment | February 2022

What is pectus carinatum?

In people with pectus carinatum, the breastbone is not level with the ribs. The breastbone is pressed outwards or raised up, so the middle of the chest is more pronounced. It usually occurs following a growth spurt, typically in children between 9 and 14 years old, though it can occur in younger children. Pectus carinatum is sometimes known as pigeon chest.

What is chest wall bracing?

Chest wall bracing is a type of treatment that can be offered to most people with pectus carinatum. It requires the person to wear a brace every day, often for as long as 2 years. The brace puts gentle pressure on the chest to change the shape and position of the breastbone over time. Treatment with bracing is time sensitive. A child's chest wall becomes more rigid (less compliant) with age, and the optimal age for bracing is between 10 and 15 years. Surgery is also a treatment option for correction, though this typically follows an unsuccessful trial of bracing.

Why is this important?

Pectus carinatum does not normally cause any physical harm or symptoms, but the appearance of the ribcage can make a child or young person self-conscious and may have an impact on their self-esteem, mental wellbeing and quality of life.

The use of chest wall bracing to treat people with pectus carinatum was first described about 25 years ago, and since then, several research studies have been published examining how the treatment is best delivered. We were asked to provide an up-to-date summary of the research to inform the treatment provided to patients in NHSScotland. The work was requested by the Scottish National Chest Wall Service which is based in the Royal Hospital for Children Glasgow.

What we did

We searched for published scientific research papers on chest wall bracing for people with pectus carinatum. We summarised the research about the clinical effectiveness, cost effectiveness, safety and patient experience of the treatment. We also identified gaps in the evidence where further research might be helpful.

What we found

Over 30 studies on the use of chest wall bracing to treat people with pectus carinatum have been published since 2006. These are mostly lower-quality observational studies which are more prone to errors than high-quality clinical trials. These studies consistently report that the use of chest wall bracing to treat people with pectus carinatum is a safe, well tolerated and clinically effective alternative to surgery. Surgery may still be required for some people if, for example, chest wall bracing fails or is not tolerated.

Compared to the general population, people with pectus carinatum may have reduced quality of life and poorer body image. Treatment of the pectus carinatum might help improve self-esteem.

Several studies reported that more patients than expected dropped out of the treatment. The reasons for stopping treatment included discomfort, skin irritation, lack of motivation, slow/no improvement in the pectus carinatum and lengthy treatment durations. To help with this, treatment protocols that result in rapid improvements in the pectus carinatum, and that reduce discomfort and pain, may make it easier for patients to continue with treatment. Family support was also highlighted in one study as important.

The studies were difficult to compare as they used the chest wall braces differently (for example, different daily wear times and total duration of treatment). This makes it difficult to say which bracing protocol is best. This is one area where further research would be helpful.

What is our conclusion?

Chest wall bracing for people with pectus carinatum appears to be a safe, well tolerated and a clinically effective alternative to surgery. Surgery may still be required for some people if, for example, chest wall bracing fails or is not tolerated. People with pectus carinatum may have reduced self-esteem and body image, and successful treatment is associated with improved patient outcomes (for example, body image and quality of life).

There is a need for more high-quality trials, particularly on the best treatment protocol (for example, how long to wear the braces each day and the total duration of treatment).

What next?

This work will be shared with colleagues at the Scottish National Chest Wall Service.

This plain language summary has been produced based on SHTG Assessment Chest wall bracing for children and young people with pectus carinatum, February 2022