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Surgical Scarring and Psychosocial Health After Aortic Valve Surgery: A Narrative Review.

Dr. Naveenraja Mohanraj[1]*, Ms. Varsha Suresh[2], Mr. Hemachandran[3], Mr. Govindaraj[4], Dr Nithya Sakthivelu[5]

[1]Assistant Professor, Department of Public Health, School of Allied Health Sciences, Vinayaka Mission's Research Foundation – Deemed to be University (VMRF-DU), Puducherry, India.
[2]Assistant Professor, Department of Cardiac Technology, School of Allied Health Sciences, Vinayaka Mission's Research Foundation – Deemed to be University (VMRF-DU), Puducherry, India.
[3]Assistant Professor, Department of Public Health, School of Allied Health Sciences, Vinayaka Mission's Research Foundation – Deemed to be University (VMRF-DU), Puducherry, India.
4Assistant Professor, Department of Radio Imaging Technology, School of Allied Health Sciences, Vinayaka Mission's Research Foundation – Deemed to be University (VMRF-DU), Puducherry, India.
5Assistant Professor, Department of Pathology, School of Allied Health Sciences, Vinayaka Mission's Research Foundation – Deemed to be University (VMRF-DU), Puducherry, India.
Corresponding author: Dr. Naveenraja Mohanraj, naveenrajamohanraj95@gmail.com

ABSTRACT: Recovery after aortic valve surgery is commonly described in terms of survival, cardiac function, symptoms and health-related quality of life. For younger adults, however, recovery can also involve changes in how the body is perceived and how comfortably a person participates in everyday social life. A visible chest scar, particularly after median sternotomy, may become a lasting reminder of surgery and may carry different meanings for different people. Some individuals may view the scar as evidence of survival, whereas others may experience self-consciousness, concerns about appearance or reluctance to expose the scar in social situations. Evidence from cardiac and broader surgical populations suggests that scar characteristics and perceptions of appearance can be related to body-image concerns and psychosocial well-being. Studies in young adults with congenital heart disease have also linked cardiac-scar-related body-image concerns with anxiety and depressive symptoms. Recent research in younger adults undergoing cardiac surgery suggests that perceptions of chest appearance are associated with body image and that body image is relevant to health-related quality of life. This narrative mini-review brings these strands of evidence together from a public health perspective. It focuses on body image, anticipated social judgement, illness identity, interpersonal relationships and social reintegration after aortic valve surgery. The review also considers how these issues could be incorporated into cardiac rehabilitation and survivorship care. The available evidence remains indirect in important respects, and there is a need for longitudinal and culturally diverse research specifically involving young adults after aortic valve surgery.

1. INTRODUCTION

Aortic valve disease may require surgical treatment during the years when people are establishing careers, relationships, family roles and independent lives. Improvements in surgical techniques, perioperative care and valve technology have contributed to better survival and functional recovery, but clinical recovery does not capture every aspect of the patient's experience. Quality of life and other patient-reported outcomes have become increasingly important when evaluating recovery after aortic valve surgery (Zakkar et al., 2018; Aicher et al., 2011).

For younger adults, the postoperative period may involve an additional challenge: adapting to a visible change in physical appearance. A median sternotomy can leave a longitudinal chest scar. Unlike medication use, prosthetic-valve treatment or many physiological changes, a scar may be visible to the patient and, in some circumstances, to other people. The significance of that visibility is not the same for everyone. A scar may be interpreted positively as a reminder of survival, or negatively as a sign of illness, vulnerability or altered appearance. This makes psychosocial recovery different from wound healing alone.

Research outside aortic valve surgery provides useful context. In a study of young adults with congenital heart disease, cardiac-scar-related body-image concerns were associated with anxiety and depressive symptoms (Grant et al., 2024). Research in broader surgical populations has also shown that scar assessment and body image can be meaningfully related (Shorka et al., 2022). More recently, a systematic review and meta-analysis found associations between scar characteristics and body-image outcomes across a range of conditions (Quong et al., 2026). These findings should not be treated as direct evidence that every person undergoing aortic valve surgery will experience psychological difficulty. Rather, they indicate that visible scarring deserves consideration as one possible component of recovery.

This mini-review therefore examines surgical scarring after aortic valve surgery through a public health and survivorship lens. The discussion focuses on body image, appearance-related stigma, illness identity and social reintegration, while recognising the limitations of applying evidence from congenital heart disease and other surgical populations to acquired aortic valve disease.

2. SURGICAL SCARRING AS PART OF THE POSTOPERATIVE EXPERIENCE

A surgical scar is an expected consequence of many cardiac procedures. In conventional open cardiac surgery, median sternotomy provides access to the heart and leaves a scar over the anterior chest. Its final appearance can vary according to the incision, healing process, individual characteristics and postoperative complications. Clinically, scar formation is part of tissue repair. From the patient's perspective, however, the scar can become part of the lived experience of illness.

The difference between an invisible treatment consequence and a visible bodily change is important. A chest scar may be noticed when a person wears particular clothing, swims, exercises or enters an intimate relationship. Earlier work among adults with congenital heart disease found that cardiac surgical scars could influence perceptions of the body and everyday life (Kańtoch et al., 2006). A later qualitative case study similarly showed how a sternotomy scar could become connected with memories, bodily experience and the process of integrating a major surgical event into one's life narrative (Tomán et al., 2024).

These findings suggest that the physical appearance of a scar should not be assumed to predict its psychological effect. The same type of scar may be interpreted very differently by two people. Personal expectations, previous experiences, relationships and the social setting in which the scar becomes visible may all influence its meaning.

3. YOUNG ADULTHOOD AND BODY IMAGE

Young adulthood is a period in which appearance, confidence, relationships and social identity can carry particular importance. Many individuals are entering employment, developing intimate partnerships, participating in sport and recreation, and becoming more independent. A visible chest scar may intersect with any of these areas, particularly when a person is already adjusting to the consequences of major cardiac surgery.

Body image is more than an objective judgement about whether a scar looks acceptable. It includes thoughts, feelings and behaviours related to one's physical appearance. Consequently, two people with apparently similar scars may report very different experiences. One may regard the scar as a marker of recovery; another may feel that it has changed the way they look or may worry about how other people will react.

Evidence from congenital heart disease is especially relevant because some patients undergo major cardiac surgery at a relatively young age. Grant et al. (2024) reported an association between cardiac-scar-related body-image concerns and emotional symptoms in young adults with congenital heart disease. The study does not establish that scarring causes anxiety or depression, and congenital heart disease is not equivalent to acquired aortic valve disease. Its value for the present discussion is therefore conceptual: body image may be an overlooked part of recovery in younger cardiac populations.

4. BODY IMAGE AND HEALTH-RELATED QUALITY OF LIFE

Aortic valve surgery can improve health-related quality of life. Studies of surgical aortic valve replacement have reported improvements in physical and mental health after surgery, although recovery is not uniform across all patients (Blokzijl et al., 2021; Henttunen et al., 2022). Improvement in average quality-of-life scores should not be interpreted as evidence that every aspect of recovery has been resolved for every individual.

Recent evidence has brought greater attention to the appearance of the chest. In adults younger than 60 years who had undergone cardiac surgery, minimally invasive access was associated with more favourable perceptions of chest appearance, while body image was positively associated with health-related quality of life (Stańska et al., 2026). The study was retrospective and cross-sectional, and its sample was small, so causal conclusions cannot be drawn. Even so, it provides a useful indication that postoperative appearance can form part of the broader patient experience.

Evidence from the wider scar literature points in a similar direction. Quong et al. (2026) synthesised evidence from 67 studies and reported associations between scar characteristics and body-image outcomes. Because the included conditions and scar types were heterogeneous, the findings should not be transferred directly to aortic valve surgery. They nevertheless support the broader proposition that the visible consequences of surgery may have psychosocial significance.

5. APPEARANCE-RELATED STIGMA AND ANTICIPATED JUDGEMENT

Body-image concerns are primarily concerned with how a person experiences their own appearance. Appearance-related stigma adds a social dimension: a person may worry that others will notice the scar, ask unwanted questions, assume that they are physically weak or view them differently. These concerns can occur even when no actual discrimination has taken place.

After cardiac surgery, possible responses may include embarrassment when the scar is visible, avoiding particular clothing, reluctance to swim or participate in recreational activities, discomfort during intimate relationships, concerns about attractiveness, fear of appearing physically different and attempts to conceal the scar. These reactions should not be assumed to occur in every patient. Rather, they represent areas that clinicians could sensitively explore when a patient reports difficulty returning to normal activities.

Earlier qualitative and observational work has shown that cardiac scars can influence perceptions of appearance and social interactions (Kańtoch et al., 2006; Shorka et al., 2022). However, evidence specifically examining appearance-related stigma after aortic valve surgery remains limited. This is an important gap because the social meaning of a scar may be influenced by age, gender, culture, relationships, occupation and expectations about appearance.

6. THE SCAR AND ILLNESS IDENTITY

A visible scar can also become part of the way a person understands their illness history. Before surgery, a young adult may primarily identify as a student, professional, athlete, partner or parent. After major cardiac surgery, the scar may introduce another element into that identity: being someone who has experienced a serious cardiac condition and survived surgery.

This change can be adaptive or distressing. Some people may regard the scar as a symbol of resilience and recovery. Others may associate it with hospitalisation, fear, pain or uncertainty. Tomán et al. (2024), in a case study of a woman after open-heart surgery, described how the sternotomy scar became connected with bodily experience and the psychological integration of the surgical event. A single case cannot establish how common such experiences are, but it illustrates why scar meaning cannot be judged from appearance alone.

For clinicians, this distinction is important. A visually prominent scar does not necessarily indicate psychological distress, while a relatively small scar may still be highly significant to an individual. Patient-centred assessment therefore needs to consider what the scar means to the person rather than relying only on its physical characteristics.

7. SOCIAL REINTEGRATION AFTER AORTIC VALVE SURGERY

Physical rehabilitation is central to recovery after cardiac surgery, but younger adults may define recovery in broader terms. Returning to education, employment, exercise, sport, friendships, intimate relationships, family responsibilities and community activities can be equally important. A person may have adequate physical capacity but still feel uncomfortable in situations where the scar is likely to be seen.

For example, someone may be medically cleared to swim but continue to avoid swimming because of embarrassment. Another person may return to work but avoid social occasions that involve clothing in which the scar could be visible. Someone else may experience difficulty with intimacy because of concerns about attractiveness or anticipated judgement. These experiences may remain hidden if follow-up focuses only on exercise capacity, symptoms and physiological outcomes.

Social reintegration may therefore be considered a patient-centred dimension of recovery. It does not imply that all patients require psychological intervention. Instead, it encourages clinicians to recognise that functional recovery and psychosocial confidence may progress at different rates.

8. A PUBLIC HEALTH PERSPECTIVE

The public health relevance of surgical scarring lies in the broader understanding of health as physical, psychological and social well-being. Cardiac survivorship increasingly involves long-term adaptation to medication, prosthetic valves, lifestyle changes and the experience of living after major illness. For younger adults, these issues can intersect with employment, relationships, social participation and expectations about appearance.

A useful conceptual model is therefore one in which the impact of a surgical scar is shaped by the interaction between the individual and their environment. Individual factors may include age, previous body-image concerns, illness perceptions and psychological resilience. Interpersonal factors include family support, friendships and intimate relationships. Healthcare factors include counselling, cardiac rehabilitation and access to psychological support. Sociocultural factors may include appearance norms, stigma, cultural expectations and social media exposure.

This framework should be understood as conceptual rather than causal. Much of the available evidence is observational, and direct evidence specific to young adults after aortic valve surgery remains limited.

9. IMPLICATIONS FOR CLINICAL PRACTICE

Preoperative counselling. Patients should receive realistic information about the expected location and appearance of surgical scars when clinically appropriate. Concerns about appearance should be treated as legitimate aspects of patient experience rather than dismissed as merely cosmetic.

Postoperative assessment. Routine follow-up could include brief, patient-centred questions about body image, embarrassment, scar-related distress and avoidance of social activities. Such questions may help identify concerns that would otherwise remain unspoken.

Psychological support. Patients who report persistent distress, significant anxiety or low mood, or substantial social avoidance may benefit from appropriate psychological assessment and referral.

Cardiac rehabilitation. Cardiac rehabilitation could address psychosocial adaptation alongside physical recovery, particularly for younger adults returning to education, employment, sport and social relationships.

Peer support. Where appropriate, contact with peers who have undergone cardiac surgery may help patients normalise their experiences and identify practical ways of adapting to visible scars.

Shared decision-making. When more than one clinically suitable surgical approach is available, patients should receive balanced information about the benefits and limitations of the options. Recent evidence suggests that minimally invasive access may be associated with more favourable perceptions of chest appearance, but current evidence is not sufficient to justify selecting an approach primarily for cosmetic reasons (Stańska et al., 2026; Hackney et al., 2025). Clinical safety, procedural suitability and long-term outcomes should remain central.

10. RESEARCH GAPS

Research specifically focused on young adults undergoing aortic valve surgery in relation to surgical scarring remains limited.

Much of the cardiac-scar literature comes from congenital heart disease populations. These studies are valuable, but congenital and acquired cardiac conditions should not be treated as interchangeable.

Body image has received more attention than appearance-related stigma and social reintegration. These domains should be examined both separately and together.

Longitudinal studies are needed because the meaning of a scar may change from the early postoperative period to later survivorship.

Culturally diverse research is needed. Expectations about clothing, relationships, marriage, employment and social acceptance may shape experiences of visible cardiac scars differently across settings.

Future studies should use patient-centred outcomes alongside clinical measures of surgical success. Qualitative work could explore how young adults describe their scars and how scars affect relationships and participation, while mixed-methods studies could examine how scar characteristics, body image, psychological well-being and social reintegration relate to one another.

11. PROPOSED CONCEPTUAL FRAMEWORK

The psychosocial implications of cardiac surgical scarring can be considered as a multidimensional process rather than a single direct pathway. The experience may be influenced by individual characteristics, interpersonal relationships, healthcare experiences and sociocultural expectations. These factors may shape how a person interprets the scar, which may in turn influence body image, emotional well-being and participation in everyday activities.

Individual factors: age, sex, previous body-image concerns, illness perception and psychological resilience.

Interpersonal factors: family support, peer relationships and intimate relationships.

Healthcare factors: counselling, cardiac rehabilitation, psychological support and surgical approach.

Sociocultural factors: appearance norms, stigma, cultural expectations and social media exposure.

Table 1. Potential psychosocial domains and clinical considerations

Psychosocial domain	Possible experience	Potential clinical response
Body image	Dissatisfaction, self-consciousness or altered perception of appearance	Routine discussion and patient-reported assessment
Appearance-related stigma	Fear of judgement or unwanted attention	Counselling and reassurance
Psychological well-being	Anxiety, low mood or persistent distress	Psychological screening and referral
Social participation	Avoidance of swimming, sport or social events	Individualised rehabilitation goals
Intimate relationships	Concerns about attractiveness or scar visibility	Sensitive, patient-led counselling
Illness identity	Feeling defined by cardiac disease	Recovery-focused psychosocial support
Quality of life	Reduced social or emotional well-being despite physical recovery	Multidimensional outcome assessment

12. FUTURE DIRECTIONS

Future research should move toward a survivorship model in which physical recovery and psychosocial adaptation are considered together. Prospective studies could assess body image, psychological well-being and social participation before surgery and at several postoperative time points. Qualitative interviews could add depth by exploring how individuals interpret their scars and how those interpretations affect relationships and everyday activities.

Intervention research is also needed. Studies could examine whether structured preoperative counselling, scar-management education, peer support or targeted psychosocial interventions improve adaptation after surgery. Importantly, future research should distinguish between the physical characteristics of a scar and the meaning assigned to it. A prominent scar may have little psychological impact for one person, while a smaller scar may be deeply distressing for another.

13. Conclusion

Aortic valve surgery can improve cardiovascular health and quality of life, but recovery for younger adults extends beyond restoration of cardiac function. A visible surgical scar may become relevant to body image, emotional well-being, illness identity and participation in social life. Evidence from cardiac and broader surgical populations suggests that scarring and perceptions of appearance can be associated with body-image concerns, while recent research in younger cardiac-surgery patients indicates that body image is relevant to health-related quality of life (Grant et al., 2024; Stańska et al., 2026; Quong et al., 2026).

At present, the specific relationship between surgical scarring, appearance-related stigma and social reintegration after aortic valve surgery remains insufficiently studied. A public health approach can help broaden the definition of recovery by recognising these concerns as potential components of survivorship rather than treating the scar solely as a cosmetic outcome. Incorporating sensitive body-image assessment, psychosocial support, peer support and social-reintegration goals into cardiac rehabilitation may help younger adults move beyond surviving surgery toward a confident return to everyday life.

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Author contribution:

1. **Dr. Naveenraja Mohanraj (First Author & Corresponding Author):** Conceptualization, study design, public health integration, qualitative protocols, ethics clearance, cohort management, drafting, and project administration.

2. **Ms. Varsha Suresh (Co-Author – Cardiac Technology):** Clinical cohort identification, surgical data extraction (sternotomy vs. minimally invasive), functional status integration, and manuscript editing.

3. **Mr Hemachandran (Co-Author– Biostatistics):** Sample size calculation, quantitative data management, statistical modeling (correlations, multivariable regression), and data curation.

4. **Dr Nithya Sakthivelu (Co-Author – Pathology):** Research/manuscript contribution.

5. **Mr. Govindaraj (Co-Author – Radio Imaging Technology):** Objective scar rating validation, photographic documentation protocols, imaging verification, and technical manuscript review.

REFERENCES

[1] Zakkar, M., Bruno, V.D., Visan, A.C., Curtis, S., Angelini, G., Lansac, E., Stoica, S., 2018. Surgery for young adults with aortic valve disease not amenable to repair. Front. Surg. 5, 18. https://doi.org/10.3389/fsurg.2018.00018.

[2] Aicher, D., Holz, A., Feldner, S., Köllner, V., Schäfers, H.-J., 2011. Quality of life after aortic valve surgery: replacement versus reconstruction. J. Thorac. Cardiovasc. Surg. 142(2), e19-e24. https://doi.org/10.1016/j.jtcvs.2011.02.006.

[3] Kańtoch, M.J., Eustace, J., Collins-Nakai, R.L., Taylor, D.A., Bolsvert, J.A., Lysak, P., 2006. The significance of cardiac surgery scars in adult patients with congenital heart disease. Kardiol. Pol. 64(1), 51-56; discussion 57-58.

[4] Grant, V.R., Crerand, C.E., Jackson, J.L., 2024. Implications of cardiac scarring on body image disturbance among young adults with congenital heart defects. J. Cardiovasc. Nurs. 39(6), E212-E217. https://doi.org/10.1097/JCN.0000000000001091.

[5] Blokzijl, F., Houterman, S., van Straten, B.H.M., Daeter, E., Brandon Bravo Bruinsma, G.J., Dieperink, W., Reneman, M.F., Keus, F., van der Horst, I.C.C., Mariani, M.A., 2021. The impact of surgical aortic valve replacement on quality of life—a multicenter study. J. Thorac. Cardiovasc. Surg. 161(4), 1204-1210.e7. https://doi.org/10.1016/j.jtcvs.2019.09.184.

[6] Henttunen, R., Kohonen, M., Laurikka, J., 2022. Improved health-related quality of life in patients 6 and 12 months after surgical aortic valve replacement. Scand. Cardiovasc. J. 56(1), 121-126. https://doi.org/10.1080/14017431.2022.2079715.

[7] Shorka, D., Yemini, N., Ben Shushan, G., Tokar, L., Benbenishty, J., Woloski-Wruble, A., 2022. Body image and scar assessment: a longitudinal cohort analysis of cardiothoracic, neurosurgery and urology patients. J. Clin. Nurs. 31(17-18), 2605-2611. https://doi.org/10.1111/jocn.16083.

[8] Tomán, E., Pintér, J.N., Hargitai, R., 2024. The role of the lived body during the integration of the traumatic experience of the sternotomy scar: a case study. J. Eval. Clin. Pract. 30(5), 804-816. https://doi.org/10.1111/jep.13925.

[9] Hackney, M., Caputo, M., Angelini, G., Vohra, H., 2025. Quality of life after minimally invasive aortic valve replacement surgery: a systematic review. Innovations (Phila). 20(3), 252-256. https://doi.org/10.1177/15569845251337405.

[10] Stańska, A., Korpacka, Z., Linda, J., Michalonek, A., Klapkowski, A., Brzeziński, M., 2026. Minimally invasive versus sternotomy cardiac surgery in younger adults: the role of body image in health-related quality of life. J. Cardiothorac. Surg. 21, 174. https://doi.org/10.1186/s13019-026-04471-5.

[11] Quong, W.L., Hadžimustafić, N., Borkhoff, C.M., Drucker, A.M., Fish, J.S., 2026. Associations between skin scars and body image: a systematic review and meta-analysis. Soc. Sci. Med. 393, 118841. https://doi.org/10.1016/j.socscimed.2025.118841.