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The Psychosocial Effects of Adult Strabismus – A Review

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34 **The Psychosocial Effects of Adult Strabismus – A Review**

35

36 Summary

37

38 Correction of adult strabismus is not a cosmetic procedure but one that restores
39 normality to an individual's appearance that has been altered by a disease process.

40 Two fundamental principles underpinning facial attractiveness are symmetry and
41 averageness – manifest strabismus effects both of these giving an unconscious signal
42 of poor genetic history.

43

44 The presence of manifest strabismus adversely affects many aspects of patients' lives
45 including finding a partner, job prospects, interaction with peers and may manifest
46 more seriously as psychiatric disorders. Surgical correction has been shown to be safe
47 and effective for the functional problems of strabismus in adults but the hugely
48 positive effects on the psychosocial aspects are only now becoming apparent. The
49 advent of a new adult strabismus specific quality-of-life questionnaire and its
50 subsequent validation will make this quantification of improvement easier. The wider
51 medical community and the public at large should be made aware of the benefits of
52 corrective strabismus surgery in adults.

53

54 **The Psychosocial Effects of Adult Strabismus – A Review**

55

56 Introduction

57

58 Adult strabismus is a common problem, present in approximately 4% of the
59 population.[1] Visual maturity occurs at approximately 8 years of age. If strabismus
60 occurs after this age, then functional problems such as diplopia give a clear indication
61 for treatment. Diplopia is not usually an issue for those adult patients in whom
62 strabismus developed before visual maturity. Strabismus has been shown to have a
63 more detrimental effect to patients' quality of life (QoL) than diabetic retinopathy,
64 with levels similar to that seen with macula degeneration or following a mild cerebro-
65 vascular accident.[2]

66

67 The treatment of adult strabismus in those patients without binocular potential or who
68 are not suffering from diplopia is regarded, by some, as "cosmetic" – this terminology
69 is incorrect. Cosmetic surgery enhances or beautifies. Strabismus is the result of a
70 disease process, which leads to a deviation from normality. Strabismus surgery is
71 performed to restore normality.

72

73 There is significant evidence that shows that adult strabismus is associated not only
74 with functional effects but also negative psychosocial changes that have wide ranging
75 effects on all aspects of the patients' lives. This review brings together the current
76 published literature with regard to human perceptions of facial attractiveness and the
77 deep-rooted prejudices associated with deviations from normality, along with the
78 psychosocial effects of strabismus and the current work in developing tools to

79 quantify these difficulties and finally document the effects of surgery on these
80 patients.

81

82 Perceptions of Body Image & Attractiveness

83

84 It takes just 150ms to judge a stranger's facial attractiveness [3] and when doing this,
85 the center of the eyes, mouth and nose are the targets for gaze.[4] Facial attractiveness
86 preferences are present from an early age, long before environmental influences have
87 been acquired [5] and are similar across cultures [6-8] indicating that attractiveness
88 has a large evolutionary component. Evolutionary psychologists believe that facial
89 attractiveness is a 'honest' indicator of health and reproductive value, playing an
90 important part in the sexual selection of species.[9-19] Facial attractiveness gives an
91 impression of being nicer, more intelligent and healthier.[9] It has even been shown
92 that more attractive defendants are given lighter sentences in the judicial system.[20]
93 But what constitutes attractiveness? Is it really in the eye of the beholder?

94

95 There are four major cues underpinning facial attractiveness:

- 96 • Averageness
- 97 • Symmetry
- 98 • Sexual dimorphism (males having masculine features and females, feminine)
- 99 • Youthfulness.

100

101 Average and symmetric faces may reflect resistance to developmental stressors, both
102 environmental and genetic.[14] The neoclassical canons describing average facial
103 proportions date back to the Renaissance artists and earlier.[9] Out of the original ten

104 canons, two include references to the ratio of the interocular distance to other aspects
105 of the facial features; 1) *the distance between the eyes is equal to the width of the nose*
106 and; 2) *the distance between the eyes is equal to the width of each eye*. These ‘golden
107 ratios’ are substantiated in the modern literature, with the ideal female facial features
108 having an interpupillary distance of 46% of face width.[21] Ocular facial features are
109 thought of as being incorporated into both a ‘length ratio’ – the vertical distance
110 between the eyes and the mouth and the ‘width ratio’ – the interpupillary distance.
111 The eye-mouth-eye angle has also been reported to be a good indicator of both
112 masculinity and symmetry.[22]

113

114 Obvious asymmetry of facial features is immediately unattractive, but as a species we
115 have evolved into finding facial asymmetry a more basic, genetic warning sign. In
116 nature, many animal species depend on their ability to perceive symmetry in potential
117 mates and it may be a marker of both developmental stability and phenotypic
118 quality.[13] Asymmetry implies poor health and bad genes with symmetry of physical
119 traits being a sign of ‘high quality’ development.[6] Facial symmetry may be an
120 indication of good health rather than attractiveness.[10] This can be supported by
121 studies finding males with less asymmetric features having more sexual partners,
122 better sperm counts and more offspring.[23-25] More symmetric females have
123 increased fertility.[26]

124

125 Psychometric testing has shown that in male faces, both increasing symmetry and
126 averageness had a positive effect on attractiveness whereas the effect of symmetry
127 was less important for female faces.[27,28] Separate studies show that females show
128 more minor elements of asymmetry than males [29] but prefer symmetric features in a

129 chosen mate.[30] This visual preference increases during the more fertile days of the
130 menstrual cycle.[31,32]

131

132 Several studies have indicated that acute alcohol intoxication reduces the ability to
133 detect asymmetry and there is a concurrent increase in the attractiveness ratings of
134 photographs.[33,34] Chronic alcohol use may cause this reduction in asymmetry
135 detection to become a permanent trait.[30]

136

137 Manifest strabismus is not a feature of the average human face. Its presence affects
138 both the golden ratio and the width ratio and increases the amount of visible
139 asymmetry greatly. Although perceptions of 'beauty' may be a higher cognitive
140 function,[35] unconscious sexual selection is a far more deep-rooted instinct and the
141 presence of ocular misalignment sends out messages of poor genetic history. A
142 common complaint in strabismic adults is difficulty in finding a life-partner. This may
143 be a partial explanation.

144

145 Objective and Subjective views of Strabismus

146

147 Strabismic individuals are likely to encounter social difficulties at all stages of life.
148 Negative responses of children to a strabismic peer are evident from the age of five,
149 with children as young as four describing 'differences' when presented with an
150 altered, strabismic toy.[36] Patching regimes have also been shown to have a negative
151 impact on a child's psychosocial wellbeing, increasing bullying and
152 stigmatization,[37] which can continue into adulthood.[38] Negative psychosocial

153 consequences have been documented in parents of strabismic children, causing some
154 difficulties in undertaking the motherhood role. [39]

155

156 Reports of the negative psychosocial effects of strabismus in adults were first
157 published in 1993 with patients reporting all aspects of their lives being affected by
158 manifest strabismus; self image, job prospects, relationships, education and sports
159 [40] and have been confirmed by many since. [38,41-45] These difficulties have been
160 reported to worsen both with increasing age [40] and with increasing strabismus size
161 [44] especially if the magnitude of deviation is greater than 25 Prism Diopters [43].
162 Young strabismic adults report difficulties in making and maintaining relationships,
163 both sexual and platonic, with members of the opposite sex - describing a lack of
164 confidence and low self-esteem as the main contributing factors. [38,40,43] It has
165 suggested that patients perceive that others would rate themselves less negatively than
166 they would rate themselves in various personality traits, indicative of an inherent lack
167 of confidence.[41] More serious manifestations include an increased incidence of
168 psychiatric disorders in young adults who developed strabismus, especially exotropia,
169 as a child. One report found that 41.3% of strabismic patients developed mental health
170 problems compared with 30.7% of controls. [46-48] There are reports of a genetic
171 linkage between constant exotropia and schizophrenia in the PMX2B gene. [49]

172

173 When viewed by others, strabismic individuals are rated more negatively than
174 controls in various attributes including: perceived health,[50] communication
175 skills,[51] intelligence,[51,52] attractiveness [53] and successfulness.[53,54] These
176 perceptions seem to translate into real difficulties gaining employment. One study
177 reported that more than 70% of employment headhunters would consider patients

178 with strabismus to have great difficulty in finding employment, with only severe acne
179 and visible missing teeth being the only facial anomalies rated more negatively. [52]
180 Large angle horizontal strabismus has also been shown to be detrimental in gaining
181 employment when the patients are judged against orthophoric controls.[55] Those
182 with manifest strabismus have been shown more unlikely to gain promotion or further
183 their career in the U.S. military.[54] When questioned, 92.5% of dating agencies
184 stated that strabismic individuals would struggle to find a partner, as they are
185 perceived as less attractive and less erotic. [53]

186

187 There is over-whelming evidence describing these negative effects on patients. There
188 is debate on the effect of both direction of deviation and sex of the patient. In studies
189 with patients self-reporting experiences, generally there is no difference between the
190 difficulties faced between those with eso- and exo-deviations.[38,40,43] Esotropic
191 males report that they have their intelligence underestimated more and are
192 discriminated against in the workplace more than exotropic males.[43] When being
193 rated by others, esotropes are generally rated worse.[50,51,54] A 2007 study found
194 that asymmetry of the face is rated as more unattractive, the more medial the
195 asymmetric feature is. With esotropia the pupil is much close to the midline than in
196 exotropia and this may explain this finding.[56]

197

198 When it was reported, strabismic females were rated more negatively than males by
199 others.[53-55] Women, in particular, are detrimentally affected by the idealized image
200 of the female body portrayed by the media [57,58] and we suggest that a similar
201 response is seen in strabismic patients..

202

203 There is inherent bias in papers dealing with a cohort of patients that have presented
204 themselves for treatment. A large numbers of people with manifest strabismus often
205 do not present for treatment. Does this self-selected group not show any negative
206 psychosocial effects? Or is it that they (and maybe their primary care provider) are
207 still unaware of the treatment options?[59] Development of robust tools to document
208 the improvement that can be gained from strabismus surgery has been previously
209 recommended.[60] The subsequent dissemination of results would help in making the
210 wider medical community aware of the potential health (both physical and mental)
211 benefits.

212

213 Development of assessment tools quantifying psychosocial difficulties

214

215 Unlike generic methods, condition-specific QoL assessment tools focus on problems
216 associated with the pathology of interest, it is therefore important that these tools are
217 developed. Development of a strabismus-specific questionnaire is important primarily
218 to assess the success or failure of service delivery in a clinical setting and also to
219 identify those patients that may require psychosocial counseling. Previous attempts
220 have been made to quantify the negative effects of strabismus by using various
221 generic questionnaires [40,44,46,61]; non-strabismus specific ophthalmic instruments
222 [42]; and locally produced questionnaires.[38-41,43,62]

223

224 Until recently there were no strabismus-specific questionnaires dealing with the
225 psychosocial aspects of strabismus. The Amblyopia and Strabismus Questionnaire
226 (ASQE) has been previously used, however only four of the twenty-six questions deal
227 with the psychosocial elements of strabismus which, although perfectly adequate

228 when dealing with the subject as a whole is not sufficient when the psychosocial
229 aspects are to be investigated and documented.[63] The 20-item Adult Strabismus
230 questionnaire (AS-20) has been made available. It was developed by distilling down a
231 181-item questionnaire, gained from patient interviews, to 20 questions, 10 dealing
232 with the psychosocial elements of strabismus and 10 with the functional
233 problems.[64] The questions used are the best discriminators. The AS-20 is a freely
234 available QoL questionnaire developed specifically for strabismic adults. The overall
235 score is the mean of all the questions answered, with a score from 0 to 100 (0 being
236 worst and 100 being best). The threshold for a normal, non-strabismic, score is 84
237 [65]. The test-retest reliability of the AS-20 is good, indicating its potential use in
238 assessing changes in strabismus over a long time period.[66]

239

240 The AS-20 has been compared directly to the 25-item National Eye Institute Visual
241 Function Questionnaire (VFQ-25) in strabismic adults and although both detected the
242 reduction in health-related QoL, the AS-20 had a greater sensitivity to the effects of
243 strabismus. The VFQ-25 identified strabismus with diplopia far better than non-
244 functional strabismus, a representation of how it was designed [65]. The AS-20 also
245 showed a strong correlation to the widely used Derriford Appearance Scale 59
246 (DAS59) QoL research tool, again being more specific to strabismus patients and not
247 being influenced by other bodily factors that can impinge on a patient's perception of
248 their own appearance [45].

249

250 Effects of strabismus surgery

251

252 A report from the American Academy of Ophthalmology (2004) concluded that
253 strabismus surgery in adults is safe and effective in: 1) restoring ocular alignment; 2)
254 eliminating diplopia; 3) restoring binocularity when achievable; 4) expanding the
255 visual field; and 5) improving any head position. It did not have any conclusions
256 regarding subjective or psychosocial benefits due to lack of studies at that time [60].
257 The cost effectiveness of strabismus surgery has been estimated at \$1632/Quality of
258 life years (QALY), less than cataract surgery or vitrectomy for diabetic vitreous
259 haemorrhage and these figures are further improved, the earlier the surgery is
260 performed.[2]

261

262 All aspects of psychosocial problems have been shown to improve following surgery.
263 The first report by Satterfield in 1993 documented the negative psychosocial effects
264 of strabismus but did not try to quantify the effects of strabismus surgery. [40] Burke
265 retrospectively reported on 15 psychosocial personality traits in 31 strabismic adults
266 and all traits improved following surgery. The traits most improved with surgery
267 were: confidence; attractiveness; self-esteem; being at ease; sociable; interactions
268 with the opposite sex. Patients perceived that people viewed them more positively
269 after surgery but did feel that others would rate them less highly than they rated
270 themselves and all scores were significantly less than they would have been in an
271 'ideal world'. Females had a more positive effect from surgery than males, as did
272 esotropes. There was no difference in scores when correlated with age.[41]

273

274 Jackson prospectively reported on the results of 3 different scores of social anxiety
275 and depression in 46 patients. The early signs of mental health issues related to
276 strabismus improved following surgery with social anxiety scores and social

277 avoidance reducing to a normative level and general anxiety levels improving. There
278 was no direct correlation between the magnitude of deviation improvement and any
279 quantitative score. In contrast to Burke, they reported that exotropic patients obtain
280 greater benefits from the surgery.[44]

281

282 Menon reported prospectively on 40 young adults. 97.5% improved their subjective
283 appearance and 95% had a significant improvement in self-confidence and personal
284 relationships following correction of their strabismus.[38] Beauchamp retrospectively
285 reported on 101 patients and significant improvements were found in: health; daily
286 tasks; social interactions; concerns; self image; job prospects.[62]

287

288 Nelson retrospectively reported on 128 strabismic adults, 85% had improved self-
289 esteem following surgery with 65% having an improved ability to meet new people,
290 this was more significant for females rather than male patients. Patients below the age
291 of 35 had a better psychosocial improvement following surgery with respect to self-
292 esteem, meeting new people, and trying new activities. Job opportunities also
293 improved, with females reporting a 15% increase in opportunities and males, 6% .[43]

294

295 The published reports of the psychosocial benefits of strabismus surgery show that
296 patients do improve greatly with surgery and this element of strabismus practice
297 should become paramount in the minds of clinicians. The idea of adult strabismus
298 surgery being 'cosmetic' is both misleading and under-appreciates the value of
299 restoring normal appearance to these patients. There is a paucity of prospective
300 studies, however the introduction of the AS-20 tool and its subsequent validation
301 should be useful in increasing this body of evidence. The levels of psychosocial

302 distress experienced by strabismus patients are beyond the clinical environment,
303 affecting all aspects of lives - from the most basic needs of finding a life-partner to
304 their job prospects and subsequent career. Providing patients with additional
305 psychosocial support in the future will have to address this and will clearly require a
306 multi-disciplinary response.

307

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309

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