The Psychosocial Effects of Adult Strabismus - A Review

Jonathan M Durnian, Carmel P Noonan, Ian B Marsh

▶ **To cite this version:**

Jonathan M Durnian, Carmel P Noonan, Ian B Marsh. The Psychosocial Effects of Adult Strabismus - A Review. British Journal of Ophthalmology, 2010, 95 (4), pp.450. 10.1136/bjo.2010.188425 . hal-00577963

HAL Id: hal-00577963
https://hal.science/hal-00577963

Submitted on 18 Mar 2011

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

The Psychosocial Effects of Adult Strabismus – A Review

Jonathan M Durnian[1] FRCOphth

Carmel P Noonan[2] FRCOphth

Ian B Marsh[2] FRCOphth

1: St Paul's Eye Unit, Royal Liverpool University Hospital, Prescot St., Liverpool, UK

2: University Hospital Aintree, Walton Hospital, Rice Lane, Liverpool. UK

Word Count Manuscript: 2511

Keywords: Adult strabismus, surgery, psychosocial effects, quality-of-life, questionnaire development.

Contact details: Mr. J.M. Durnian
St. Paul's Eye Unit,
Royal Liverpool University Hospital,
Prescot St,
Liverpool.
UK.

Tel: 0151 706 3992
Fax: 0151 706 5861

E-mail: jondurnian@me.com

The Psychosocial Effects of Adult Strabismus – A Review

Summary

Correction of adult strabismus is not a cosmetic procedure but one that restores normality to an individual's appearance that has been altered by a disease process. Two fundamental principles underpinning facial attractiveness are symmetry and averageness – manifest strabismus effects both of these giving an unconscious signal of poor genetic history.

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

The Psychosocial Effects of Adult Strabismus – A Review

Introduction

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

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

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

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

Perceptions of Body Image & Attractiveness

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

There are four major cues underpinning facial attractiveness:

- Averageness
- Symmetry
- Sexual dimorphism (males having masculine features and females, feminine)
- Youthfulness.

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

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

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

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

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

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

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

Objective and Subjective views of Strabismus

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

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

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

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

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

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

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

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

Development of assessment tools quantifying psychosocial difficulties

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

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

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

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

Effects of strabismus surgery

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

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

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

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

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

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

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

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

The authors have no proprietary or financial interest in any aspect of the study.

The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, an exclusive licence (or non-exclusive for government employees) on a worldwide basis to the BMJ Group and co-owners or contracting owning societies (where published by the BMJ Group on their behalf), and its Licensees to permit this article (if accepted) to be published in the British Journal of Ophthalmology and any other BMJ Group products and to exploit all subsidiary rights, as set out in our licence.

References:

1. Coats DK, Stager DR Sr., Beauchamp GR et al. Reasons for delay of surgical intervention in adult strabismus. *Arch Ophthalmol.* 2005;123:497-9.
2. Beauchamp CL, Beauchamp GR, Stager DR Sr et al. The cost utility of strabismus surgery in adults. *J AAPOS*. 2006;10:394-9.
3. Goldstein, A., and Papageorge, J. Judgments of facial attractiveness in the absence of eye movements. *Bull. Psychon.Soc.* 1980;15: 259
4. Mertens I, Siegmund H, Grusser OJ. Gaze motor asymmetries in the perception of faces during a memory task. *Neuropsychologia* 1993;31:989-998.
5. Slater A, Schulenburg C von der, Brown E et al. Newborn infants prefer attractive faces. *Infant Behaviour and Development.* 1998;21:345-354.
6. Rhodes G, Yoshikawa S, Palermo R et al. Perceived health contributes to the attractiveness of facial symmetry, averageness, and sexual dimorphism. *Perception*. 2007;36:1244-52.
7. Little AC, Apicella CL, Marlowe FW. Preferences for symmetry in human faces in two cultures: data from the UK and the Hadza, an isolated group of hunter-gatherers. *Proc Biol Sci*. 2007;274:3113-7.
8. Little AC, Jones BC, Waitt C et al. Symmetry is related to sexual dimorphism in faces: data across culture and species. *PLoS One.* 2008;3:e2106.
9. Bashour M. History and current concepts in the analysis of facial attractiveness. *Plast Reconstr Surg*. 2006;118:741-56.
10. Zaidel DW, Aarde SM, Baig K. Appearance of symmetry, beauty, and health in human faces. *Brain Cogn.* 2005;57:261-3.

11. Rhodes G, Yoshikawa S, Clark A et al. Attractiveness of facial averageness and symmetry in non-western cultures: in search of biologically based standards of beauty. *Perception*. 2001;30:611-25.
12. Scheib JE, Gangestad SW, Thornhill R. Facial attractiveness, symmetry and cues of good genes. *Proc Biol Sci*. 1999;266:1913-7.
13. Rhodes G, Yoshikawa S, Palermo R et al. Perceived health contributes to the attractiveness of facial symmetry, averageness, and sexual dimorphism. *Perception*. 2007;36:1244-52.
14. Rhodes G. The evolutionary psychology of facial beauty. *Annu Rev Psychol*. 2006;57:199-226.
15. Rhodes G, Zebrowitz LA, Clark A et al. Do facial averageness and symmetry signal health? *Evol Hum Behav*. 2001;22:31-46.
16. Mealey L, Bridgstock R, Townsend GC. Symmetry and perceived facial attractiveness: a monozygotic co-twin comparison. *J Pers Soc Psychol*. 1999;76:151-8
17. Franklin Jr. RG, Adams Jr. RB. The two sides of beauty: Laterality and the duality in facial attractiveness. *Brain Cogn* 2010;72:300-5.
18. Grammer K, Thornhill R. Human (Homo sapiens) facial attractiveness and sexual selection: the role of symmetry and averageness. *J Comp Psychol*. 1994;108:233-42.
19. Kowner R. Facial asymmetry and attractiveness judgment in developmental perspective. *J Exp Psychol Hum Percept Perform*. 1996;22:662-75.
20. Patry MW. Attractive but guilty: deliberation and the physical attractiveness bias. *Psychol Rep*. 2008;102:727-33.

21. Pallett PM, Link S, Lee K. New “golden” ratios for facial beauty. *Vis Research*. 2010:50;149-54.
22. Danel D, Pawlowski B. Eye-mouth-eye angle as a good indicator of face masculinization, asymmetry, and attractiveness (Homo sapiens). *J Comp Psychol*. 2007;121:221-5.
23. Moller AP, Thornhill R. A meta-analysis of the heritability of developmental stability. *J. Evol. Biol.* 1997;10: 1-16.
24. Moller A. P., and Thornhill, R. Bilateral symmetry and sexual selection: A meta-analysis. *Am. Nat.* 1998;151: 174-92.
25. Manning J. T., Scutt, D., and Lewis-Jones, D. I. Developmental stability, ejaculate size, and sperm quality in men. *Evol. Hum. Behav*. 1998;19: 273-282.
26. Manning J. T., Scutt, D., Whitehouse, G. H., et al. Breast asymmetry and phenotypic quality in women. *Evol. Hum. Behav*. 1997;18: 223-236.
27. Komori M, Kawamura S, Ishihara S. Averageness or symmetry: which is more important for facial attractiveness? *Acta Psychol (Amst)*. 2009;131:136-42.
28. Komori M, Kawamura S, Ishihara S. Effect of averageness and sexual dimorphism on the judgment of facial attractiveness. *Vision Res*. 2009;49:862-9.
29. Ercan I, Ozdemir ST, Etoz A et al. Facial asymmetry in young healthy subjects evaluated by statistical shape analysis. *J Anat*. 2008;213:663-9.
30. Oinonen KA, Sterniczuk R. An inverse relationship between typical alcohol consumption and facial symmetry detection ability in young women. *J Psychopharmacol*. 2007;21:507-18.

31. Little AC, Jones BC, Burt DM et al. Preferences for symmetry in faces change across the menstrual cycle. *Biol Psychol*. 2007;76:209-16.
32. Oinonen KA, Mazmanian D. Facial symmetry detection ability changes across the menstrual cycle. *Biol Psychol*. 2007;75:136-45.
33. Souto A, Bezerra BM, Halsey LG. Alcohol intoxication reduces detection of asymmetry: an explanation for increased perceptions of facial attractiveness after alcohol consumption? *Perception*. 2008;37:955-8.
34. Halsey LG, Huber JW, Bufton RD et al. An explanation for enhanced perceptions of attractiveness after alcohol consumption. *Alcohol*. 2010 May 28. [Epub ahead of print]
35. Honekopp J. Once more: is beauty in the eye of the beholder? Relative contributions of private and shared taste to judgments of facial attractiveness. *J Exp Psychol Hum Percept Perform*. 2006;32:199-209.
36. Paysse EA, Steele EA, McCreery KM et al. Age of the emergence of negative attitudes toward strabismus. *J AAPOS*. 2001;5:361-6.
37. Koklanis K, Abel LA, Aroni R. Psychosocial impact of amblyopia and its treatment: a multidisciplinary study. *Clin Experiment Ophthalmol*. 2006;34:743-50.
38. Menon V, Saha J, Tandon R et al. Study of the psychosocial aspects of strabismus. *J Pediatr Ophthalmol Strabismus*. 2002;39:203-8.
39. Kothari M, Balankhe S, Gawade R et al. Comparison of psychosocial and emotional consequences of childhood strabismus on the families from rural and urban India. *Indian J Ophthalmol.* 2009;57:285-8.
40. Satterfield D, Keltner JL, Morrison TL. Psychosocial aspects of strabismus study. *Arch Ophthalmol*. 1993;111:1100-5.

41. Burke JP, Leach CM, Davis H. Psychosocial implications of strabismus surgery in adults. *J Pediatr Ophthalmol Strabismus*. 1997;34:159-64.
42. Hatt SR, Leske DA, Kirgis PA et al. The effects of strabismus on quality of life in adults. *Am J Ophthalmol*. 2007;144:643-7.
43. Nelson BA, Gunton KB, Lasker JN et al. The psychosocial aspects of strabismus in teenagers and adults and the impact of surgical correction. *J AAPOS*. 2008;12:72-76.
44. Jackson S, Harrad RA, Morris M et al. The psychosocial benefits of corrective surgery for adults with strabismus. *Br J Ophthalmol*. 2006;90:883-8.
45. Durnian JM, Owen M, Marsh IB. The psychosocial aspects of strabismus; correlation between the AS-20 and DAS59 quality-of-life questionnaires. *J AAPOS*. 2009;13:477-80.
46. Bez Y, Coskun E, Erol K et al. Adult strabismus and social phobia: a case-controlled study. *J AAPOS*. 2009;13:249-52.
47. McKenzie JA, Capo JA, Nusz KJ et al. Prevalence and sex differences of psychiatric disorders in young adults who had intermittent exotropia as children. *Arch Ophthalmol*. 2009;127:743-7.
48. Mohney BG, McKenzie JA, Capo JA et al. Mental illness in young adults who had strabismus as children. *Pediatrics*. 2008;122:1033-8.
49. Toyota T, Yoshitsugu K, Ebihara M et al. Association between schizophrenia with ocular misalignment and polyalanine length variation in PMX2B. *Hum Mol Genet*. 2004;13:551-61.
50. Uretmen O, Egrilmez S, Kose S et al. Negative social bias against children with strabismus. *Acta Ophthalmol Scand*. 2003;81:138-42.

51. Olitsky SE, Sudesh S, Graziano A et al. The negative psychosocial impact of strabismus in adults. *J AAPOS*. 1999;3:209-11.
52. Mojon-Azzi SM, Mojon DS. Strabismus and employment: the opinion of headhunters. *Acta Ophthalmol*. 2009;87:784-8.
53. Mojon-Azzi SM, Potnik W, Mojon DS. Opinions of dating agents about strabismic subjects' ability to find a partner. *Br J Ophthalmol*. 2008;92:765-9.
54. Goff M, Suhr A, Ward J et al. Effect of adult strabismus on ratings of official U.S army photographs. *J AAPOS*. 2006;10:400-3.
55. Coats D, Paysse E, Towler A et al. Impact of large angle horizontal strabismus on ability to obtain employment. *Ophthalmology*. 2000;107:402-5.
56. Spinger IN, Wannicke B, Warnke PH et al. Facial attractiveness: visual impact of symmetry increases significantly towards the midline. *Ann Plast Surg*. 2007;59:156-62.
57. Monro F, Huon G. Media-portrayed idealized images, body shame and appearance anxiety. *Int J Eat Disord*. 2005;38:85-90.
58. Strahan EJ, Wilson AE, Cressman KE et al. Comparing to perfection: How cultural norms for appearance affect social comparisons and self-image. *Body Image*. 2006;3:211-27.
59. Coats DK, Stager DR Sr, Beauchamp GR et al. Reasons for delay of surgical intervention in adult strabismus. *Arch Ophthalmol*. 2005;123:497-99.
60. Mills MD, Coats DK, Donahue SP et al. Strabismus surgery for adults: a report by the American Academy of Ophthalmology. *Ophthalmology*. 2004;111:1255-62.
61. Archer SM, Musch DC, Wren PA et al. Social and emotional impact of strabismus surgery on quality of life in children. *J AAPOS*. 2005;9:148-51.

62. Beauchamp GR, Black BC, Coats DK et al. The management of strabismus in adults--III. The effects on disability. *J AAPOS*. 2005;9:455-9.
63. Felius J, Beauchamp GR, Stager DR Sr, et al. The Amblyopia and Strabismus Questionnaire: English translation, validation, and subscales. *Am J Ophthalmol*. 2007;143:305-310.
64. Hatt SR, Leske DA, Bradley EA et al. Development of a quality-of-life questionnaire for adults with strabismus. *Ophthalmology*. 2009;116:139-144.
65. Hatt SR, Leske DA, Bradley EA et al. Comparison of quality-of-life instruments in adults with strabismus. *Am J Ophthalmol*. 2009;148:558-62.
66. Leske DA, Hatt SR, Holmes JM. Test-retest reliability of health-related quality-of-life questionnaires in adults with strabismus. *Am J Ophthalmol*. 2010;149:672-6.