

## Research Article

# The Impact of Eye Loss and Prosthetic Eye Wear on Recreational, Occupational and Social Areas of Functioning

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**Background:** This study aims to explore the impact of eye loss and prosthetic eye wear on recreational, occupational and social areas of functioning.

**Methods:** Two hundred and seventeen anophthalmic patients who had worn a prosthetic eye for at least two years and were older than 16 years responded to an invitation to complete an anonymous questionnaire. Descriptive and inferential statistics were used to investigate differences between variables. Content analysis was used to analyse participants' open responses.

**Results:** Participants reported a range of difficulties in occupational, social and recreational areas of functioning. Those who experienced problems in these areas reported stronger negative feelings and were more concerned about their appearance and visual perception than those who had developed strategies to overcome these problems.

**Conclusion:** This study identified recreational activities, social functioning and workplace activities as the main areas where functional difficulties are experienced by prosthetic eye wearers. The study (often using patients' own words) describes the impact of unilateral eye loss on these activities and demonstrates how eye loss and prosthetic eye wear can negatively affect anophthalmic patients' behaviour and cognitive processing. It is important to prepare patients for this and to provide coping strategies that address patients' appearance and visual perception concerns due to their negative impact on functioning.

**Keywords:** Prosthetic eye wearers; Psychology; Functioning; Concerns; Ocular prosthesis; Psychological difficulties; Anophthalmia

## Introduction

A prosthetic eye is used to replace a missing natural eye and scleral shell prosthesis fits over a disfigured non-functioning eye [1]. Previous research has established that losing an eye can negatively impact one's psychological wellbeing. In fact, McBain, Ezra, Rose and New man [2] concluded that a patient's adjustment to wearing an ocular prosthesis was associated with psychological variables rather than clinical or demographic factors. McBain, et al. [2] also found that prosthetic eye wearers who had a pessimistic outlook, negative self-image and a perceived lack of acceptance from society had poorer psychological wellbeing. Another study investigated the emotional experiences of individuals following eye loss and found that 32% were preoccupied with hiding their disfigurement 'a great deal', 22.5% felt sad and 15% felt shy. At least 10% had 'a great deal' of feelings of shame, insecurity, fear, inferiority and anger [3]. The most common difficulties of those with facial disfigurement concern social interactions, with affected individuals being subjected to intrusive staring and comments [4].

Almost all the literature on the psychological adjustment of patients living with a prosthetic eye has focused on appearance issues [2,5,6], but when an eye is lost or disfigured, there are also visual

perception changes such as impaired depth perception and restricted visual range as well as a need to cope with the inconvenience of wearing a prosthetic eye-in particular mucoid discharge from the eye socket which is reported to affect 91% of anophthalmic patients [7].

Until now, the specific functional impact of eye loss or of wearing an ocular prosthesis has received minimal research attention. This study helps to address this by asking prosthetic eye wearers directly about their experiences of occupational, social and/or recreational difficulties. It is expected that the greater the negative impact on functioning, the greater the negative impact on psychological wellbeing (and vice versa). The study covers current functional impacts as well as those experienced in the past.

The findings of this study will provide greater insight into the practical implications of unilateral eye loss, which will hopefully lead to more targeted psychological support and advice for current and future prosthetic eye wearers.

## Materials and Methods

### Recruitment

Once the Massey University Human Ethics Committee granted ethics approval, a questionnaire was mailed or emailed to potential

participants from the database of the New Zealand Prosthetic Eye Service, a private practice with six clinics spread across the North Island of New Zealand. Of the 540 potential participants contacted about the research (181 via email), 217 completed the questionnaire (40% response rate). All participants were at least 16 years old and had worn an ocular prosthesis for at least 2 years.

### Questionnaire

The questionnaire included 29 questions and 5 psychological scales across 4 main categories (demographics, concerns, feelings and problems, psychological scales). This study covers the problems section of the questionnaire, which asked participants if they had any problems in social, occupational and recreational areas of functioning either currently or in the past. This study also draws upon demographic information gathered (age, gender, education, ethnicity, relationship status, occupation, age when eye lost, etiology, duration of prosthesis wear) and participants' concerns regarding appearance, mucoid discharge and visual perception.

### Data analysis

The Statistical Package for the Social Sciences for Mac (version 23) was used to analyze the quantitative data. Independent t-tests were used to analyze differences between: the presence of functional problems (employment, social, recreational) and levels of concern (discharge, appearance, visual perception) and the age at time of eye loss and the presence of functional problems.

Participants' open responses regarding the functional impacts of eye loss were analyzed using content analysis. This identified descriptive themes within the data and their frequencies [8]. The percentage of responses within each category was computed, with the most commonly occurring responses being viewed as the most important [9]. For this reason, only categories that obtained percentages over 10% were reported in the results.

## Results

### Participants

The majority of participants were New Zealand European (76%), followed by Maori (13%), other (7%), Asian (3%) and Pacific Islander (1%). Participants' average age was 58 years. They had worn a prosthetic eye for 27 years on average and 67% were male.

The gender ratio on 67% men in the study population roughly aligns with the 59% men in a larger survey of prosthetic eye wearers in New Zealand [10]. The representation of New Zealand Europeans (76%) and Pacific Islanders (1%) aligns with that in the general population (75% and 0.08% respectively) [11]. However, there is an under representation of Maori (13%) and Asian (3%) ethnicities compared to the general population (16% and 12% respectively) [11], possibly because it was an English language questionnaire.

### Demographic effects

On average, participants with social problems lost their eye at a younger age ( $M = 20.4$ ,  $SD = 18.74$ ) than those without social problems ( $M = 32.3$ ,  $SD = 21.31$ ,  $p < .001$ ). This may be due to the developmental period of younger people and the importance of belonging to social groups and forming intimate relationships during this time [12]. Participants with social difficulties were also younger at the time of the study ( $M = 54.2$ ,  $SD = 13.82$ ) compared

**Table 1:** Differences in mean level of concern items according to the presence or absence of recreational, employment and social problems.

RECREATIONAL				
Concern items	Problems	No problems	Mean difference	Sig.
Mucoid discharge	2	1.79	0.21	0.128
Appearance	2.15	1.85	0.3	.035*
Visual perception	2.11	1.64	0.47	.000*
EMPLOYMENT				
Concern items	Problems	No problems	Mean difference	Sig.
Mucoid discharge	2.02	1.86	0.16	0.309
Appearance	2.39	1.87	0.53	.001*
Visual perception	2.07	1.71	0.36	.015*
SOCIAL				
Concern items	Problems	No problems	Mean difference	Sig.
Mucoid discharge	2.2	1.75	0.45	.001*
Appearance	2.48	1.72	0.76	.000*
Visual perception	2.14	1.74	0.4	.003*

\*The mean difference is significant at the 0.05 level.

to those without difficulties ( $M = 60.7$ ,  $SD = 13.83$ ,  $p = .001$ ). There were no significant relationships between social problems and other demographic measures or with any demographic measures and occupational or recreational problems ( $p > 0.05$ ).

### Functional difficulties of unilateral eye loss

The most common functional difficulties reported by participants were experienced with recreational activities (57%), social functioning (40%) and employment or workplace activities (32.4%).

### Recreational activities

Of those participants whose free comments identified problems with recreational activities, 30.5% had stopped playing, or had particular difficulties with ball sports ("Used to play tennis and squash, still possible but very different level, no longer fun for me"), non-ball sports such as swimming and mountain biking, or contact sports ("Would not play rugby in case of further injury"). Twenty six percent commented that their recreational activities were affected by monocular limitations (i.e., reduced peripheral vision and impaired distance perception) ("I am not brilliant anymore at coordination and catching a ball is only average", "Can't judge a moving ball", "Playing pool has become very difficult - judging distance and angles has become very handicapping"). Monocular vision also impacted on other sports or activities (e.g., "I would love to learn to dance, but scared my sight would make me look silly trying to turn etc and not seeing on my right side", "Horse riding judging speed and distance, also some balance problems", "Minor problems skiing - have to constantly look to my right to avoid other skiers"). Nineteen percent commented that their recreational activities were affected by fear of their prosthetic eye falling out (e.g., during swimming, surfing, diving, water skiing) and sixteen percent commented that they had successfully adapted to initial difficulties.

Successful adaptation's mentioned by this group included how they developed strategies or used aids to compensate for problems ("Afraid that if I came off my water-ski the eye may pop out. So I wear an eye patch", "I was scared my eye would fall out in the waves...I have

learnt to turn my back on the waves more and close my eyes hard”, “I returned to playing rugby 4 months after I lost my eye, taught myself to catch the high ball, which was a re-aligning problem”). Others avoided the activity, removed their eye, or used aids like underwater goggles.

Participants with recreational difficulties reported significantly stronger negative feelings ( $M = .70$ ,  $SD = .92$ ) than those without difficulties ( $M = .41$ ,  $SD = .79$ ,  $p < 0.001$ ). Those with recreational problems were also significantly more concerned about their appearance and visual perception (Table 1).

### Social functioning

Of the 40% of participants who had experienced problems in their social lives, 28% reported that this was due to other peoples' reactions or behavior, 23% to social interactions, 18% to appearance concerns and 12.6% to meeting new people.

Other peoples' reactions mainly included other people staring, name-calling or making hurtful comments and asking questions (“At school some teasing, remarks, unkindness”, “Passing snide and judging comments”, “My partner left me. My family thought it was a joke. The amount of people that make jokes about ‘where’s ya parrot’ really hurt”).

Social interactions brought on negative feelings such as shyness, inferiority, embarrassment, insecurity, feeling scared, self-conscious, different from others or less of a person, or lacking confidence. One participant explained that “for a while, confrontations about the prosthetic eye tended to be quite intimidating and would evoke feelings of inferiority as I felt less of a person, in turn this lead to jealousy and pushing people away from me...”.

Worries about appearance included disguisability of their prosthetic eye such as the movement of the prosthesis, drooping eyelid, discharge, pupil dilation and feeling unattractive (“The awareness that I look different from others rarely leaves me...”, “It makes you very conscious and always fretting about whether the eye looks close to normal”).

Meeting new people or having romantic relationships was cited as another social difficulty (“I took a very long time to move in a social setting. I regarded the fact that I had only one eye was a drawback in mixing socially. My mates actively sought female company whereas I was quite reclusive”, “The moment I wore it and socialized with friends, it was obvious they were aware of my wearing something artificial that did not seem natural and that in turn made me very aware...it often led to my lacking confidence, avoiding meeting people and generally staying away from meeting friends”).

Prosthetic eye wearers who reported experiencing social problems had significantly stronger negative feelings ( $M = .91$ ,  $SD = 1.01$ ) than those without ( $M = .32$ ,  $SD = .67$ ,  $p < 0.001$ ). Those with social difficulties also had significantly higher discharge, appearance and visual perception concerns than those without (Table 1).

### Employment and workplace activities

Of those participants who experienced problems with employment and workplace activities, 35% reported that this was because of other peoples' reactions and 35% reported that monocular limitations negatively impacted their work.

Other peoples' reactions included negative responses or comments, employers' doubts, jobs not being offered and others' not knowing how to respond (“Name-calling”, “Employers are always doubtful about me having one eye only. Mostly I get declined for the position that I am applying for. That makes me feel very low”, “I have been turned down for a job because my eye would be ‘off putting’ to customers in a front line role”, “People do not know how to meet your eyes when talking directly to you”, “Workplace bullying”).

Monocular limitations negatively impacted participants' work (“Lack of distance and perception of surfaces cost me my employment as a head green keeper and made some other employments problematic until I made adjustments”, “Worked in electrical industry working amongst live overhead wire. Handicapped by peripheral vision and still have instances with that blind spot”). There was also some concern about safety due to monocular vision (“Nail guns and aim”, “Driving forklifts and working at heights”).

Prosthetic eye wearers who have experienced employment problems reported having significantly stronger negative emotions ( $M = .83$ ,  $SD = .97$ ) than those with no employment problems ( $M = .39$ ,  $SD = .74$ ,  $p < 0.001$ ). They were also significantly more concerned about appearance and visual perception than those without employment problems (Table 1).

## Discussion

The finding that prosthetic eye wearers with occupational, social and/or recreational difficulties experienced stronger negative emotions is consistent with the idea that when a problem negatively impacts on functioning, its severity typically increases and its impact on mood intensifies [13].

Participants with employment and recreational difficulties were particularly concerned with visual perception and specifically reported monocular limitations as being a reason for these difficulties. This is especially relevant to occupations or recreational activities that have high visual demand and require sufficient depth perception and field of vision, both of which are negatively impacted following acquired monocular vision [14]. It is important therefore to inform prosthetic eye wearers that there are strategies available to help them compensate for these limitations (e.g., turning their head more towards the side of the lost eye, positioning others on their sighted side when walking or sitting, placing mirrors on their blindside on their work desk or in their car [1]).

Participants with recreational, social and occupational difficulties were particularly concerned about appearance, as well as visual perception. Other peoples' reactions were also a common source of stress for these participants. A number of studies have investigated difficulties in social settings for those with facial disfigurement. It is important to note the significant role eyes have in communication and ‘perceived physical attractiveness’ and in turn, the understandable impact that damage to them could have on ones social interactions. In fact, this population typically has high levels of social anxiety and avoidance of social situations [4,2], which we can now link to not only appearance concerns but also to the practical impacts of acquired monocular vision and mucoid discharge. The findings of the current study were consistent with previous research, which suggested that monocular patients experienced social functioning impairment and

role difficulty (e.g., difficulties with hobbies and job performance and negative feelings towards social interpersonal relationships) [15-18]. The social impact of eye loss can affect both personal and professional lives, particularly as this population typically has low self-esteem and expectations about life chances in employment and relationships [4]. First meetings are also particularly difficult [19], as are forming long-term friendships [20].

If an individual is repeatedly exposed to negative social events, behaviour change such as avoidance of social situations (as well as of recreational activities) can occur; however, it is important to consider the role of the individual's beliefs and behaviour during social interactions. Research has found that in those with facial disfigurements, the expectation of a negative response from others is sufficient for them to report events differently. That is, their heightened sensitivity to their disfigurement and idea of being treated negatively leads to the misinterpretation of events or subtle changes in their behaviour (e.g., poor eye contact, poor posture), which then produce stronger reactions from the observers [4]. Sensitivity to the disfigurement and tendency to attribute all negative experiences to appearance is commonly reported amongst the facially disfigured population [21].

Information processing biases have also been reported in that affected individuals are selective in their interpretation of social feedback, primarily focusing on information that supports their internalized views of themselves and ignoring evidence that challenges it [22]. These particular beliefs and behaviours are important to consider when planning psychological intervention. Having good social skills has been found to be associated with successful adjustment [23,24], which also highlights the importance of social skills training.

The results of this study demonstrate that eye loss and prosthetic eye wear can negatively affect the behaviour and cognitive processing of anophthalmic patients. This can lead to negative impacts on important areas of functioning, thus increasing the likelihood of greater psychological difficulties. This highlights the need for psychological support and strategies to be provided, particularly during the early stages of eye loss and prosthetic eye wear, so to reduce this potential negative impact and improve the psychological wellbeing of prosthetic eye wearers.

## Conclusion

This study identifies recreational activities, social functioning and employment or workplace activities as the main areas where functional difficulties are experienced by prosthetic eye wearers. The study (often using patients' own words) describes the impact of unilateral eye loss on these activities and demonstrates how eye loss and prosthetic eye wear can negatively affect the behaviour and cognitive processing of anophthalmic patients. It is important to prepare patients for this and to provide coping strategies that address patients' appearance and visual perception concerns due to their negative impact on functioning.

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