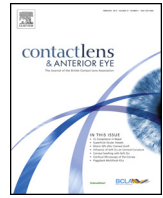




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Contact lens wear by Royal Air Force aircrew in World War II



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ABSTRACT

Purpose: To provide an overview of the use of contact lenses by RAF aircrew in World War II by identifying some of the fitters and wearers and appraising the clinical results that they achieved.

Methods: A wide-ranging literature search was undertaken that encompassed peer-reviewed journals, non-refereed publications, books, official publications, newspapers and archived documents.

Results: Thirty-one aircrew are known to have worn sealed scleral lenses in order to meet the required visual standards. Of these, only two were considered to be completely unsuccessful, one of whom was unilaterally aphakic. One additional case of undisclosed contact lens wear was found and the identity of this officer was established. Brief biographies of a few pilots establish the context of their contact lens wear.

Conclusion: Overall, the results of scleral lens wear were variable reflecting those achieved by civilian patients of the period. While three men complained of discomfort due to heat and glare, one pilot experienced no photophobia when flying above white clouds in brilliant sunshine and another found no difficulty caused by altitude or tropical climate. Wearing time ranged from about 2 h to 16, or more, hours. In about a third of the cases, wearing time was limited due to the onset of a form of contact lens induced-epithelial oedema known as Sattler's veil and effective solutions to this problem were not implemented until after the war.

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1. Introduction

The aim of this paper is to present an overview of the use of contact lenses by RAF aircrew in World War II by identifying some of the fitters and wearers and appraising the clinical results that they achieved.

Prior to this war, there had been very little mention of contact lens wear in association with aviation.

It has been suggested that Carl Zeiss glass scleral contact lenses were worn nearly 100 years ago by German pilots in World War I [1] but no contemporaneous reports have been found to substantiate this claim. Nevertheless, in 1946 Treissman and Plaice wrote "As an example of the great safety of contact lenses, there is the much quoted case of the Zeppelin pilot who fell from an airship and was killed. Although his body, including the skull, was literally reduced to pulp, the Zeiss lenses which he was wearing were intact" [2]. Assuming that this anecdote is based on fact, the incident must have occurred during the First World War. It is pertinent to note that Carl Zeiss only commenced the manufacture of contact lenses in 1911 [3] and that the first clinical report of their use was published in 1913 [4]. At that time, these ground glass lenses were fitted to

achieve improved visual acuity in cases of keratoconus. Since the earliest ones were afocal, a spectacle correction was still required making their use by pilots an unlikely proposition.

In 1938, by which time Zeiss lenses could be supplied for the correction of refractive errors, it was recorded that in a series of 120 cases, two of whom were pilots, 'The majority of patients can achieve all-day wear and the longest wearing time for which Zeiss contact lenses were worn without any harmful effect was 40 h. Some patients reported that they sometimes forgot to remove their lenses at night because they had experienced no discomfort' [5].

2. Methods

A literature search was undertaken that concentrated on the Second World War period and included peer-reviewed journals, non-refereed publications, books, official publications, newspapers and archived documents.

3. Results

3.1. Practitioners who fitted aircrew with contact lenses

Brief case reports relating to the fitting of aircrew were included by the optometrists, Frank Dickinson (1906–1978) and Keith G.

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Clifford Hall (1910–1964) in Appendix B of their contact lens textbook, which was published in 1946 [6].

The dispensing optician, Charles H Keeler (1903–1993), Managing Director of C Davis Keeler Ltd, was awarded an Air Ministry contract to fit pilots and observers whose visual acuity had deteriorated during their service to the extent that an optical correction was required. He also fitted protective shells in cases involving facial burns [7].

In 1937, Theodore Hamblin Ltd, a firm of dispensing opticians, established the Contact Lens Centre in London under the direction of the pioneer of impression scleral lenses, Hungarian-born ophthalmologist, Dr József (Joseph) Dallos (1905–1979) [8]. His obituary stated that ‘During the war period he worked with the RAF ophthalmologist, Wing Commander Livingston, on special cases requiring contact lenses’ [9].

3.2. Aircrew fitted with contact lenses

In compliance with medical confidentiality, none of those who wrote about the fitting of RAF personnel disclosed their patients’ names in publications. For example, the fitting of two pilots was reported by Dickinson & Hall [6], one of whom was Flying Officer ‘B.B.’, age 23 years whose spectacle refraction was:

RE $-2.50/-1.25 \times 80$ VA 6/4.5
LE $-2.00/-0.50 \times 90$ VA 6/4.5

Visual acuities with contact lenses were recorded as R & L 6/6+³ and the wearing time limited to 6 h due to the onset of ‘clouding’. This officer was awarded a Distinguished Flying Cross (DFC) for the destruction of three enemy planes.

The second pilot was Flying Officer ‘G.S.’, age 25 years whose spectacle refraction was:

RE $+3.50/-0.50 \times 10$ VA 6/5+
LE $+4.00/-0.50 \times 180$ VA 6/6–³

Visual acuities with contact lenses were RE 6/6+⁴ LE 6/5. The binocular status was described as ‘R.con.strab’ but the near equality of the visual acuities suggests that some alternation of the esotropia occurred. Within one year, his wearing time was 16 h at which point slight ‘clouding’ occurred but a change of fluid allowed further wear. There was no problem with photophobia when flying above white clouds in brilliant sunshine. No bubbles formed under the lenses even at an altitude of 22,500 feet. Both glass and plastic lenses were supplied but the former were preferred. It is likely that the preference for glass lenses was due to their better wetting.

It seems that Dickinson & Hall used the patient’s actual initials in their reports as those of an actor, ‘E.K.’, can be recognized readily as Esmond Knight (1906–1987). Unfortunately, it is not possible to identify their cases, ‘B.B.’ and ‘G.S.’, since too many officers shared the same initials [10].

The following individuals have been identified as contact lens wearers in the course of World War II and brief biographies establish the context of their use.

3.2.1. Flying Officer H S Squires RAFVR

Harry Stanley Squires (1909–1950) was an all-round sportsman whose obituary remarked that ‘Throughout his cricket career Squires wore glasses. During the war he served in the RAF reaching the rank of Flying Officer. After spending two years in the Hebrides he returned to this country wearing contact lenses which he used for boxing, squash, Rugby and Association football as well as cricket’ [11]. A newspaper stated briefly that ‘Flying-Officer Squires has been trying out the new contact lenses and reports on them favourably’ [12]. However, it is not known whether he was ever



Fig. 1. Flt Lt John Worthington Harder RAFVR, DFC standing on the wing of a Supermarine Spitfire.

a member of aircrew and his contact lens wear may have been confined to sport.

3.2.2. Flight Lieutenant J R Colville RAFVR

John Rupert Colville (1915–1987), who was knighted in 1974, was a civil servant who worked as assistant private secretary to Sir Winston Churchill (1874–1965) when he became Prime Minister in 1940. Colville wrote that in 1941, eager to play some active part in the war, he presented himself for a medical examination and was told that that he could only become a pilot if he were fitted with contact lenses at his own expense [13]. He duly obtained contact lenses from an unnamed practitioner and flew the single-engine North American Mustang fighter initially in 268 squadron, which served as a tactical reconnaissance unit, and subsequently for less than three months in 168 squadron, which was involved in army co-operation and ground attack. Colville expressed relief that he had not been posted to Bomber or Coastal Command squadron in which operational flights were of a much longer duration that exceeded his wearing time of about 2 h.

3.2.3. Flight Lieutenant J W Harder RAFVR, DFC

John Worthington Harder (1923–1977) (Fig. 1) was an American who was born in New York City and already held a civilian pilot’s licence when he joined the RAFVR in October 1941. After training Oklahoma, he was sent in mid-1942 to Britain, where he served for a short period with Coastal Command, before transferring to Bomber Command where it was found that he no longer met the visual standards (Personal communication with Colin Foster). In

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