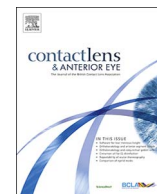




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Trends in contact prescribing in Japan (2003–2016)

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ABSTRACT

Purpose: To review contact lens prescribing trends in Japan between 2003 and 2016.**Methods:** An annual survey of contact lens prescribing trends was conducted each year between 2003 and 2016. Japanese ophthalmologists were asked to provide information relating to ten consecutive contact lens fittings between January and March every year.**Results:** Over the 14 years of the annual survey, data from a total of 64,122 contact lens fits were returned by ophthalmologists. The mean age (\pm SD) of lens wearers was 30 ± 13 years, and 68% were female. The proportion of rigid lens fits decreased over time, from 35.4% in 2003 to 14.7% in 2016. Across this period, daily disposable lens fits increased, representing 46% in 2016. The proportion of toric lenses and multifocal lenses gradually increased, from 6.6% and 1.9% to 12.3% and 5.8%, respectively. Silicone hydrogel material use grew from 0% to 43.2%, while mid and low water content lens materials declined from 54.1% and 28.2% to 36.1% and 8.3%, respectively. Multi-purpose lens care solutions dominated the market over the 14 year survey period.**Conclusions:** This survey has revealed prescribing trends and preferences in Japan over the past 14 years, with the main changes observed being a decrease in rigid lens use and an increase in the use of silicone hydrogel materials and daily disposable lenses.

1. Introduction

Contact lens technology has evolved considerably over the past decade, with new lens and lens care systems becoming available.

These innovations would be expected to have a significant impact on the way contact lenses are prescribed.

The monitoring of contact lens prescribing trends allows practitioners to evaluate their own prescribing patterns against national trends and to serve as a guide to the contact lens industry as to which products, wearing modalities and replacement frequencies are preferred by practitioners and lens wearers.

Japan is generally considered to be one of the largest contact lens prescribing countries in the world. Contact lens wearers are reported to account for more than 10% of the Japanese population [1]. Only two studies have been previously published in the peer-reviewed literature documenting contact lens prescribing trends in Japan. Hamano [2] surveyed more than 60,000 lens wearers between 1973 and 1980 and Nishida [3] surveyed 7759 lens wearers between 2002 and 2003. These early studies of Hamano and Nishida provide useful historical markers against which current trends can be compared.

A survey has been conducted annually in Japan since 2003 as part of the International Contact Lens Prescribing Survey Consortium. This survey has generated a dataset spanning 14 years (2003–2016), which is analyzed in this paper.

2. Methods

2.1. General conduct of the annual survey

From 2003 to 2016, a survey was annually undertaken of 1000 ophthalmologists randomly selected from the register of the Japanese Contact Lens Society. Optometrists were not surveyed as they are not involved in contact lens prescribing in Japan. The surveys were sent during the same spring months each year, in an attempt to minimize any possible seasonal effects.

Essentially the same questionnaire format was used each year, with only minor changes made to reflect the introduction of new modalities of lens wear or lens care into the market. The English version of the 2016 questionnaire is shown in Appendix A. This questionnaire form was translated into Japanese and sent to ophthalmologists. The

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Table 1
Information captured about each patient fitted.

Information Category	Options
Date of fitting	Days/month
Age	In years
Sex	Male Female
Type of fit	New fit Refit
Rigid lens material/type	Scleral PMMA Dk < 40 Dk 40–90 Dk > 90
Soft lens materials	Conventional hydrogel < 40% water Conventional hydrogel 40–60% water Conventional hydrogel > 60% water Silicone hydrogel
Lens design	Sphere Toric Multifocal monovision Cosmetic tint Orthokeratology Other
Frequency of replacement	Daily 1–2 weeks 1 month 3–6 months 12 months Unplanned
Times per week of wear Modality	1–7 Daily wear Extended wear
Care system	Multi-purpose hydrogen peroxide Iodine Heat Other None

questionnaire was a one-side form: practitioners were requested to enter a number of background details, to supply general information about the first ten contact lens fits performed after receipt of the questionnaire, and then to return it by mail upon completion. Practitioners were asked to return the form after three months irrespective of the number of patients fitted (if less than ten). The information gathered about lenses and care system is detailed in Table 1.

2.2. Statistical analysis

Graphs were generated using summary pivot tables and graph-plotting functions in Microsoft Excel. Changes in fitting practice over time were deduced by inspection of the generated graphs with reference to the calculated confidence limits. The Chi-square test was used to compare categorical variables and one-way ANOVA was used to analyse continuous variables between the groups. For data reported as proportions, 95% confidence limits were determined by normal approximations, as it is reasonable to assume the population size significantly exceeds the sample size. As the two major subgroups are soft and rigid lenses, the calculated annualized confidence interval of $\pm 1.03\%$ was used.

3. Results

3.1. Patient demographics

Over the 14-year survey period, an average annual response rate of 47.4% resulted in 6636 surveys being returned, reporting on a total of 64,122 contact lens fits. There was no statistically significant difference in practitioner response rate between any years during the survey period ($p > 0.05$).

Averaged over all years of the survey, the patients fitted had a mean age of 30 ± 13 years, with a range of one to 99 years. Males and females were aged 27 ± 12 years and 31 ± 14 years, respectively. Fig. 1 shows a histogram of the proportion of lens fitting according to age for all patients. The peak age range for contact lens fitting was 16 to 20 years, representing one third of all fits.

The average age of patients in this survey did not change over the survey period ($p > 0.05$). However, the proportion of fits to those under 20 years old increased significantly from 27.08% in 2003 to 35.87% by 2016 ($p < 0.05$). There were no apparent trends in respect of the average age of all patients over the course of survey. The proportion of fits to females remained consistent over the survey period at

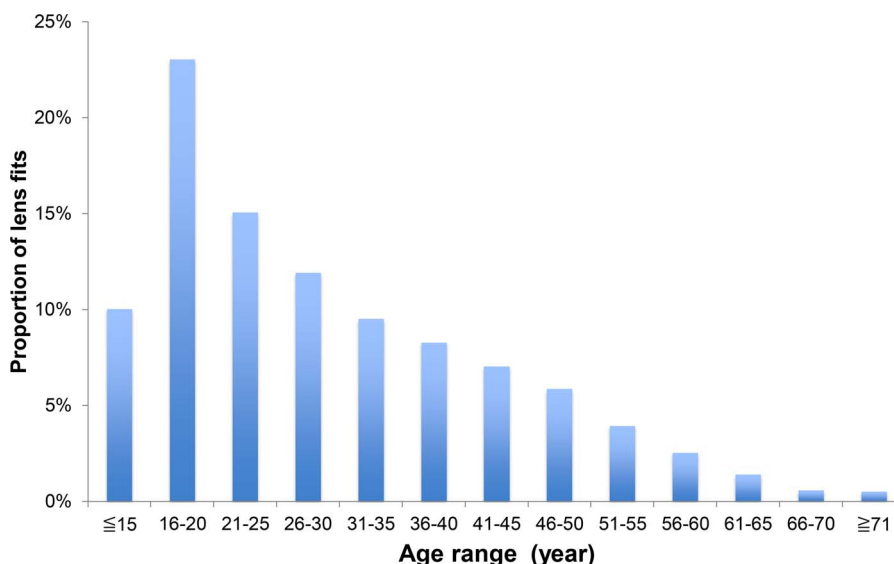


Fig. 1. Proportion of lens fits according to age.

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