

# Incidental encounter: cataract surgery reveals bilateral double arcus senilis — a rare and uncharted ocular phenomenon

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## ABSTRACT

**BACKGROUND:** The purpose was to report a rare case of bilateral double arcus to add on to the existing few cases and stimulate further investigations into the genesis and associations of this clinical entity, which seems not so uncommon. The authors present a case report of a single patient presented for cataract surgery with an incidental finding of clinical entity.

**CASE PRESENTATION:** A 60-year-old male patient with no systemic illness presented to the hospital with both eyes gradually progressive diminution of vision for the past six months. On examination, he had both eyes immature senile nuclear sclerosis grade three with double arci of alternating opacity and lucid intervals suggestive of double arcus senilis/ double arcus cornealis. He underwent both eyes uneventful sequential cataract surgery at 2-month interval. Double arcus is a rare clinical entity with very few case reports in the literature. This case report is meant to generate awareness and curiosity about studying the entity in detail before labeling it as a variation of the normal human aging process.

**CONCLUSION:** Double arcus is a not-so-uncommon clinical entity, but it needs further investigation to understand its pathophysiology and any associations that could provide further insights. Clinical identification and excluding differential diagnosis often provide reassurance to patients and Ophthalmologists prior to any ocular surgery, especially the most commonly performed cataract surgery.

**KEY WORDS:** arcus senilis; ageing; arcus cornealis; double arcus; ocular abnormality

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## INTRODUCTION

Arcus senilis or arcus cornea occurs due to lipid deposition in the corneal stroma near the limbus [1]. It is also known by names such as arcus lipoides or gerontoxon. This is the most common corneal peripheral degeneration occurring irrespective of gender. It is frequently associated with hyperlipidaemia, mainly in an older population, and can be related to dyslipidaemia in young patients (juvenile arcus). It is considered part of the normal aging

process without any effect on visual quality. The appearance of arcus senilis at a young age often needs detailed investigations for dyslipidaemia and altered lipid metabolism or enzyme deficiencies [2]. Dense arcus has not been associated with any systemic pathology in older individuals. However, the unusual or atypical appearance of a normal aging process needs detailed investigations, especially when the number of such cases is not so rare that it can be classified as a normal physiological variant [3].

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Finding the exact pathophysiology of the atypical entity can validate the classification of such entities to the regular variant. Researchers should be stimulated by reporting such entities and give us a point of initiation of research into them, as often these unique case reports also have differences between them. We wanted to report such a case that came as an uncharted phenomenon before cataract surgery that made a diagnostic dilemma for the resident doctors. The diagnostic dilemma has been resolved, but for a curious researcher, the validation seems acceptable when we can aptly explain the pathophysiological mechanism of the entity, too.

### CASE REPORT

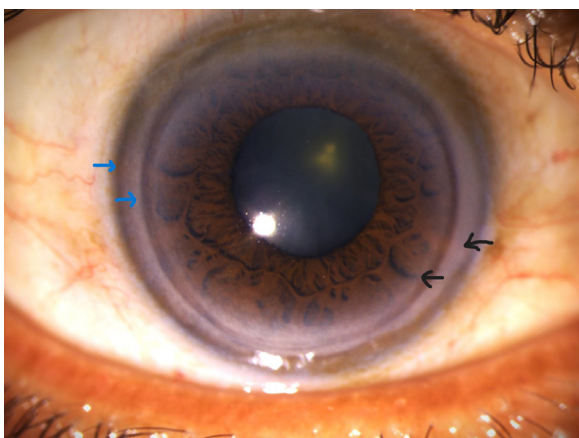
A 60-year-old male patient presented to us with both eyes gradually progressive, painless diminution of vision for the past six months. There were no associated redness or watering or eye trauma in the past. He does not have any significant medical or surgical history. On examination, his uncorrected visual acuity in the right eye was 6/60; in the left, it was 6/36 on Snellen's chart. Intraocular pressures were 16 mm Hg and 14 mm Hg in the right and left eye, respectively, with non-contact tonometry. On slit lamp examination, he had both eyes immature senile nuclear sclerosis grade three. Careful examination of the right cornea revealed two circumferential opacities with two intervening lucid or clear spaces of arcus senilis (Fig. 1). The left cornea also shows the same clinical picture (Fig. 2). Hence, a diagnosis of both eyes, immature nuclear sclero-

sis grade three with double arcus, was made. He underwent both eyes uneventful sequential cataract surgery at two months intervals with the best corrected visual acuity of 6/6 in both eyes on Snellen's chart.

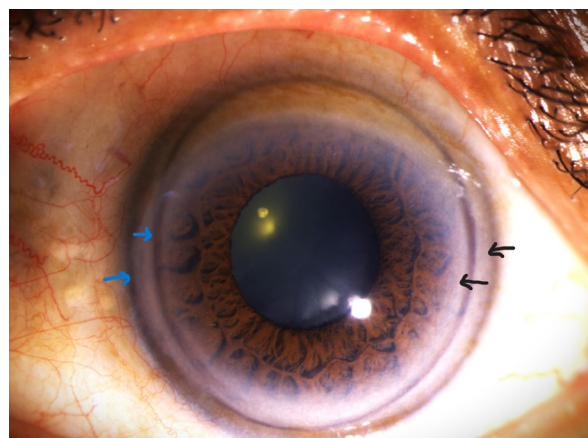
### DISCUSSION

Arcus senilis, also known as arcus cornealis, is a well-recognized age-related corneal degeneration characterized by lipid deposition in the corneal stroma near the limbus. It is a common finding in elderly individuals and has historically been considered a benign and expected part of the aging process. Typically, arcus senilis presents as a grey or white ring-like opacity encircling the peripheral cornea. This case report presents a fascinating and uncommon variation of arcus senilis: bilateral double arcus senilis, where two concentric rings of opacity are separated by intervening clear spaces. This phenomenon is exceptionally rare, with only a few cases reported in the literature [1, 2]. The discovery of such an unusual presentation underscores the need for further investigation to understand its aetiology and associations better [3].

Arcus senilis is thought to develop due to the deposition of lipids, primarily cholesterol, within the corneal stroma. This process is believed to occur because lipoproteins with low-density cholesterol can easily pass through limbal vessels, which become more permeable with age. Consequently, over 70% of individuals over sixty exhibit some degree of arcus senilis [4]. The classic pattern of arcus senilis begins in the upper and lower peripheral



**FIGURE 1.** A Slit-lamp image of the right eye on diffuse illumination shows two concentric dense arcs (blue arrows) with intervening two concentric lucid intervals (black arrows)



**FIGURE 2.** A slit-lamp image of the left eye on diffuse illumination shows two concentric dense arcs (blue arrows) with intervening two concentric lucid intervals (black arrows)

cornea, where perfusion is higher than in the central cornea. Importantly, arcus senilis does not typically result in tissue atrophy or necrosis, nor does it exhibit increased cellularity, vascular abnormalities, or changes in lipogenesis patterns on histological examination [4–6]. However, the unique aspect of bilateral double arcus senilis, in this case, raises intriguing questions about its pathophysiology. It remains unclear why two clear zones and opacity are observed in this condition. One hypothesis is that the development of double arcus senilis may involve immunological neutralization or self-absorption of deposited lipids from the inner zone of dense arcus, resulting in this distinct configuration. Detailed histopathological and immunological correlation studies are warranted to gain insights into the pathophysiological processes underlying double arcus senilis.

Furthermore, this case report emphasizes the importance of clinical awareness and differential diagnosis in ophthalmology. While arcus senilis is generally benign, recognizing variations like double arcus senilis can help ophthalmologists rule out other potential ocular abnormalities. It is crucial to consider differential diagnoses such as juvenile arcus and peripheral corneal dystrophy in cases with atypical presentations [3].

## CONCLUSION

Bilateral double arcus senilis is a rare and intriguing ocular phenomenon that warrants further investigation. This case report serves as a reminder that even well-established clinical entities can present with unique variations, stimulating curiosity among researchers and providing a starting point for in-depth studies. Understanding the pathophysiology and associations of double arcus senilis may contribute to a more comprehensive understanding of corneal degenerations and their clinical implications.

## LEARNING POINTS

Bilateral double arcus senilis is a rare clinical entity that requires detailed histopathological correlation to understand its pathophysiology.

Differential diagnoses should include juvenile arcus and peripheral corneal dystrophy when encountering atypical presentations of corneal arcus.

Clinical awareness and differential diagnosis are essential in ophthalmology to provide accurate assessment and reassure patients before ocular surgery.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity and anonymity.

### Conflict of interest

Authors declare no conflict of interests.

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