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# RETINA DIGEST®

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## Effect of Physical Activity On Age-related Macular Degeneration

**A**ge-related macular degeneration (AMD), the most common cause of irreversible severe vision loss among white populations in developed countries, is a complex disease associated with many environmental risk factors. Nearly one-third of people aged >70 years are affected by early, non-sight-threatening stages of AMD; 10% to 20% of these cases later progress to sight-threatening late-stage disease. Currently, there is no standard intervention to prevent or delay AMD.

Growing evidence supports the positive influence of physical activity on successful aging for most older patients without disabilities. However, most of the available evidence assessing the protective effect of physical activity on age-related ocular diseases such as AMD is inconclusive. McGuinness et al from the University of Melbourne, Australia, conducted a systematic review and meta-analysis of available litera-

ture on physical activity and AMD. Utilizing MEDLINE, EMBASE and Google Scholar to search for studies, the authors reviewed articles using 3 main eligibility criteria:

1. reported outcome of AMD
2. inclusion of physical activity as a risk factor/study variable
3. reported odds ratio with measure of variance, or aggregate data usable to calculate odds ratio

After reviewing 620 articles, the authors identified 9 studies that met their inclusion criteria

### Inside this Issue

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for the meta-analysis. Included in the studies were 40,879 patients, ranging in age from 21 to 97 years.

The findings of this meta-analysis supported the public health message of staying active throughout life. The pooled estimate from the meta-analysis showed

- a 7% reduction in the odds ratio for early AMD in patients with active lifestyles.
- a 41% reduction in the odds ratio for late AMD in patients with active lifestyles.

In this meta-analysis, an active lifestyle was defined by as little as 3 hours of moderate-to-low-intensity physical activity per week. As little as 15 minutes of moderate-intensity physical activity per day can help a large proportion of the elderly population achieve a multitude of positive longer-term health outcomes.

While further longitudinal data are required to confirm the protective effect of physical activity on the development and/or progression of AMD, these findings do support an association between physical activity and lower odds of early and late AMD in white populations.

*McGuinness MB, Le J, Mitchell P, et al. Physical activity and age-related macular degeneration: a systematic literature review and meta-analysis. Am J Ophthalmol 2017;108:29-38.*

## Association of Basketball Injury and Traumatic Retinal Detachment

The body contact that occurs during basketball puts players at an increased risk of injury. One common injury sustained while playing basketball is ocular trauma. Yet the severity of basketball-related eye trauma is often overlooked. Some of these injuries, such as ocular contusions, are commonly ignored. However, if left untreated, ocular trauma can lead to vision-threatening complications such as retinal detachment.

Lee et al from Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Taiwan, conducted a retrospective review of 13 eyes of 13 patients (12 men; mean age, 18.2 years; age range, 13–38 years) who had sustained retinal detachment associated with a history of basketball-related ocular trauma between January 2003 and March 2015.

Nine patients presented with injuries caused by direct blunt contusion from the basketball; 4 patients suffered injuries from various types of body contact. None of these patients wore protective eyewear during the basketball games, and all of them reported symptoms of blurry vision after the accident. Patients were classified by type of retinal injury (Table 1):

- **retinal dialysis:** 1 patient
- **giant tear:** 1 patient
- **simple break:** 9 patients
- **multiple breaks:** 2 patients

Rhegmatogenous retinal detachment occurred in all eyes; superior lesions were encountered more frequently than were inferior lesions. Nine patients (69%) presented with moderate-to-high myopia.

The study participants waited an average of 2.4 months (range, 0.1–12 months) between suffering eye trauma and initial medical intervention. Once evaluated, the average time between diagnosis and treatment was 5.3 days (range, 1–20 days). All patients underwent surgery:

**Table 1.** Type and location of the presenting retinal injury

Type of retinal injury	No.	Superior lesion	Inferior lesion
Retinal dialysis	1	1	0
Giant tear	1	1	0
Simple break	9	6	3
Multiple breaks <sup>a</sup>	2	1	2
Total	13	9	5

<sup>a</sup>Multiple breaks may present in both superior and inferior retina.

- 8 eyes (62%) underwent scleral buckle
- 2 eyes (15%) underwent vitrectomy with silicone oil tamponade
- 3 eyes (23%) underwent combined scleral buckle and vitrectomy with silicone oil tamponade

The average postoperative follow-up was 3.9 years (range, 4 months–12 years). Only 38% of patients achieved a visual acuity of 20/40 or better by their last follow-up. However, the initial visual acuity proved to be the only independent factor affecting the final visual outcome in the multivariate analysis.

To reduce the possibility of ocular injury, especially during sports with high risk for eye injury such as basketball, the use of certified protective eyewear is highly recommended. In cases where basketball-related trauma has already occurred, early diagnosis followed by surgical intervention is essential to stop the deterioration of vision. Prevention and awareness of the risks of basketball-related eye injury are important, and additional large-scale studies are needed to further investigate the incidence and characteristics of basketball-related retinal injuries.

*Lee T-H, Chen Y-H, Kuo H-K, et al. Retinal detachment associated with basketball-related eye trauma. Am J Ophthalmol 2017;180:97-101.*

## Diplopia in Patients Diagnosed with Epiretinal Membrane

An epiretinal membrane (ERM), a thin sheet of tissue that develops over the surface of the macula, may cause abnormalities of the retinal mosaic and lead to retinal conditions such as binocular diplopia. It is unclear whether diplopia can be caused specifically by the ERM. To determine the specific causes of diplopia in patients diagnosed with both an ERM and symptomatic diplopia, Veverka et al from the Mayo Clinic School of Medicine, Min-

**Table 2.** Cause of diplopia in the 25 ERM patients with symptomatic diplopia

Cause of diplopia	n (%)
Retinal misregistration (central-peripheral rivalry-type diplopia)	11 (44)
Strabismus	7 (28)
Mixed retinal misregistration (central-peripheral rivalry-type diplopia) and strabismus	2 (8)
Optical/refractive error (monocular diplopia)	1 (4)
Indeterminate	4 (16)

nesota, conducted a retrospective observational study of patients seen by both retinal and strabismus specialists.

Patients were required to have undergone both retina and strabismus examinations within 6 months of each other. Optical coherence tomography was performed and reviewed by a retina specialist to confirm the presence of a visually significant ERM in one or both eyes.

Of the 50 patients (29 men; mean age, 70 years; age range, 51–94 years) diagnosed with ERM, 25 had symptomatic diplopia, and 25 had no diplopia. All patients reported their race as white. Twenty-six of the 50 patients had a coexisting retinal condition or history of a retinal condition, including 12 patients (46%) with diplopia and 14 patients (54%) without.

Data were recorded and evaluated based on the outcomes of various clinical tests. A standardized questionnaire evaluated the frequency with which patients experienced diplopia. Orthoptic evaluation included testing ocular alignment to determine whether a patient had retinal misregistration. The presence of retinal misregistration was also identified by the optotype-frame test and customized synoptophore slides with 5° and 10° targets.

The clinicians reviewed various data from primary and subsequent examinations. The most prevalent cause of diplopia, as shown in 11 of 25 patients (44%), was retinal misregistration, followed by strabismus (28%), mixed retinal misregistration and strabismus (8%), and optical/refractive error (4%). In the remaining pa-



tients, the cause remained indeterminate (16%; Table 2). Unexpectedly, 15 of the 25 patients without diplopia (60%) presented evidence of retinal misregistration.

These results demonstrated that some patients may have other, more treatable causes of diplopia, such as strabismus or optical-refractive error, that coexist with an ERM and retinal misregistration. Many of the cases exemplified the need for extensive clinical testing before the exact cause of diplopia can be determined. Although the presence of retinal misregistration may be a necessary prerequisite, it alone may not be sufficient for central-peripheral rivalry-type diplopia development in patients with an ERM.

*Veverka KK, Hatt SR, Leske DA, et al. Causes of diplopia in patients with epiretinal membranes. Am J Ophthalmol 2017; 179:39-45.*

## Age-related Macular Degeneration and Vitreomacular Adhesion

**A**ge-related macular degeneration (AMD) is the leading cause of several visual impairments, yet its pathogenesis remains complex and misunderstood. Some large studies have identified age, cigarette smoking, heredity and race as risk factors for the disease; recently, vitreomacular adhesion (VMA) has been hypothesized to be another risk factor for AMD.

Maggio et al from Sacro Cuore Don Calabria Hospital, Italy, conducted a retrospective cross-sectional analysis and longitudinal cohort study to investigate the prevalence of VMA in a series of naïve eyes diagnosed with recent-onset exudative AMD. The authors compared these with eyes affected by nonexudative AMD and eyes with no signs of AMD. Also evaluated was the incidence of spontaneous release of VMA over time and VMA's influence on the development of choroidal neovascularization (CNV).

A total of 1067 eyes examined between August 2008 and June 2015 met the inclusion criteria.

All patients had had a complete ophthalmologic examination; patients with exudative AMD also underwent a routine scanning protocol. Three groups of eyes were enrolled; both of a patient's eyes were included if they met the eligibility criteria.

- **Exudative AMD group:** 403 eyes of 364 patients (mean age, 77.8 years); VMA was present in 101 eyes, of which spontaneous release of VMA was found in 15.
- **Nonexudative AMD group:** 350 eyes of 298 patients (mean age, 78.1 years); VMA was present in 84 eyes, of which spontaneous release of VMA was found in 21.
- **Group with no signs of AMD:** 314 eyes of 214 patients (mean age, 74.2 years); VMA was present in 84 eyes, of which spontaneous release of VMA was found in 10.

The study results showed no significant difference between the prevalence of VMA in eyes affected by AMD and that in the age-matched controls, nor did they show any influence of VMA on development of CNV in eyes with nonexudative AMD. With regard to the rate of CNV development or progression of disease, no significant difference was found between eyes with and without VMA. Further investigation and larger-population studies are needed to definitively clarify the role of VMA as a risk factor for AMD.

*Maggio E, Polito A, Guerriero M, et al. Vitreomacular adhesion and the risk of neovascular age-related macular degeneration. Ophthalmology 2017;124:657-666.*

### SUMMER 2018

- Ocular sarcoidosis
- Retinitis pigmentosa and cataract surgery
- MEK inhibitor-associated retinopathy

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