

Exercise and the Diabetic Retina

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I. Introduction

Does Exercise Damage the Retinas of People With Diabetes?

II. The Myths About Exercise and Diabetic Retinopathy

- Patients with diabetes should refrain from vigorous physical activity
- Patients with diabetes should refrain from jarring exercise (e.g. basketball or kick boxing)
- Patients with diabetes should refrain from weight training or activities that elevate BP

III. The Realities

- No retinopathy = no immediate risk to the eye
- Most cases of preexisting retinopathy = no immediate risk to the eye
- Staging of retinopathy is the key to gauging risk to the retina
- Successful treatment of retinopathy essentially negates risk

IV. Retinopathy Staging

- a. Background DRT: dots and blots
 - b. Pre-proliferative DRT: cotton wool spots, vein beading
 - c. Proliferative DRT: new blood vessels bleed profusely and result in vitreous traction
 - d. Diabetic Macular Edema: retinal swelling & thickening within the macula
- Only c. and d. can cause vision loss

V. Exercise raises blood pressure and might increase vitreo-retinal traction, either of which may lead to vision loss in the following circumstances:

- Actively bleeding proliferative diabetic retinopathy
- PDR with significant vitreous traction
- Untreated “clinically significant macular edema”
- The glyceemic “re-entry phenomenon”

VI. Benefits of Exercise for the Retina

- Lowers the risk of seven of seven diabetic eye diseases
- Diabetic Eye Diseases: Cataract, Glaucoma, Keratopathy, Ischemic Optic Neuropathy, Cranial Neuropathy, Retinal Vascular Occlusion, Retinopathy
- Benefits derive from improved control of blood sugar, blood pressure and blood lipids

VII. Importance of Blood Pressure in DRT Progression

retinal micro-circulation is especially susceptible to increased blood pressure

retinal perfusion pressure (RPP) measures the force of blood flow into the eye and rises faster (non-linearly) than BP

$RPP = 2/3 (MAP) - IOP$ where $MAP = (systolic\ BP - diastolic\ BP)/3 + diastolic\ BP$
and IOP = intraocular pressure

RPP > 50mm raises the risk of vision threatening retinopathy by 5-6 fold

VIII. Conclusion

Regular exercise is perhaps the single best measure to lower the risk of diabetic eye disease and severe loss of vision due to diabetes

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