

WHEN AND HOW TO TREAT MYOPIC TRACTION MACULOPATHY

Surgical technique should be chosen based on detailed evaluation.

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In 1958, before the emergence of optical coherence tomography (OCT), Phillips described retinal detachments without the presence of a macular hole (MH) in eyes with high myopia.¹ In 1999, Takano and Kishi first reported

the detection of retinoschisis-like structures and tractional retinal detachments (RDs) using OCT in eyes with high myopia and posterior staphylomas.²

More recently, based on considerable evidence from OCT and surgical findings, an entity called myopic traction maculopathy (MTM) has been defined. MTM includes retinal thickening, a macular retinoschisis-like structure, lamellar MH, and foveal RD (FRD). It is considered to develop due to a complex of traction forces from adherent vitreous cortex, epiretinal membrane (ERM), internal limiting membrane (ILM), retinal vessels, and posterior staphyloma.³⁻⁵

The prevalence of MTM is reported to be 9% to 34.4% in highly myopic eyes.^{6,7} In an observational study, Gaucher et al reported that MTM with FRD was likely to develop a full thickness MH (FTMH).⁸ Shimada et al reported variations in the natural course of myopic retinoschisis.⁹ In their report, they classified eyes with myopic retinoschisis into four stages, from S0 to S4, based on the size and area of retinoschisis. They reported that 42.9% of eyes with S4 myopic retinoschisis (retinoschisis of the entire macular area) showed progression in morphologic status; however, 10.7% of these eyes improved without surgical treatment. They also found that two of 45 eyes with S2 myopic retinoschisis developed FTMH during 2 years of follow-up.

This evidence makes it difficult to determine the surgical indications for MTM. However, to prevent the development of FTMH and subsequent MH RD, early surgical treatment may be necessary. In this article we

discuss when and how to perform pars plana vitrectomy for the treatment of MTM.

WHEN TO PERFORM VITRECTOMY FOR MTM

MTM is thought to progress from myopic retinoschisis to lamellar MH and/or FRD. In our own observational case series of the surgical outcomes for MTM, FTMH, and MH RD with high myopia, the mean best corrected visual acuity (BCVA) at 6 months after vitrectomy in eyes treated for MH RD was significantly worse compared with that of eyes treated for MTM and FTMH (unpublished data). Thus, it is preferable to operate before the development of MH RD.



AT A GLANCE

- Myopic traction maculopathy (MTM) includes retinal thickening, a macular retinoschisis-like structure, lamellar MH, and foveal RD (FRD), and is considered to develop due to a complex of traction forces from adherent vitreous cortex, ERM, ILM, retinal vessels, and posterior staphyloma.
- The time and method of intervention for MTM should be determined based on a detailed evaluation of the foveal microstructures and the patient's condition.
- New retinal imaging techniques, including swept-source OCT, OCT angiography, and adaptive optics, may provide deeper structural information to understand the tractional mechanisms and recovery process of MTM.

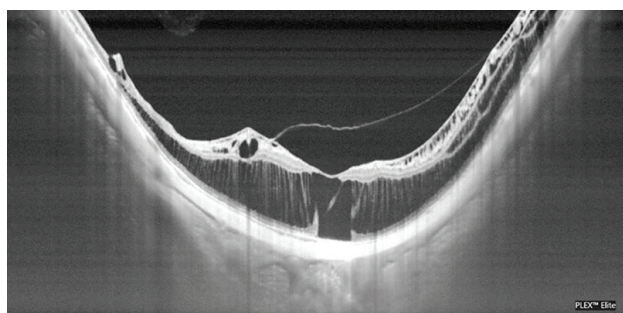


Figure 1. A thin slice-volume scan on OCT demonstrates the presence of a micromacular hole in an eye with myopic retinoschisis and FRD.

Previous reports described that postoperative BCVA correlated with preoperative BCVA.^{10,11} It has also been reported that visual improvement resulting from surgical treatment of MTM correlated with symptom duration.¹¹ Thus, we propose that the best time to perform vitrectomy for MTM is when visual acuity just starts worsening, before the appearance of FRD, or at the appearance of an early FRD.

We also emphasize the importance of precise examinations using optical coherence tomography (OCT) during follow-up of MTM. To detect early FRD or micro-MH, thin-slice volume scans of OCT are useful to detect microstructural changes in the fovea (Figure 1). Swept-source OCT is also helpful to evaluate a wide area of the vitreoretinal surface for the presence of partial or complete posterior vitreous detachment (PVD), ERM, disruption of ILM, and determination of the thickness of the nerve fiber layer before vitrectomy (Figure 2).

“The exact mechanism for the development of MTM is still unclear, but residual vitreous cortex and ILM may be the main sources of traction.”

We occasionally observed rapid development of MTM from severe retinoschisis to FRD or micro-MH, even when the waiting period for surgery was as short as a couple of weeks. Thus, OCT evaluation immediately before surgery is also recommended.

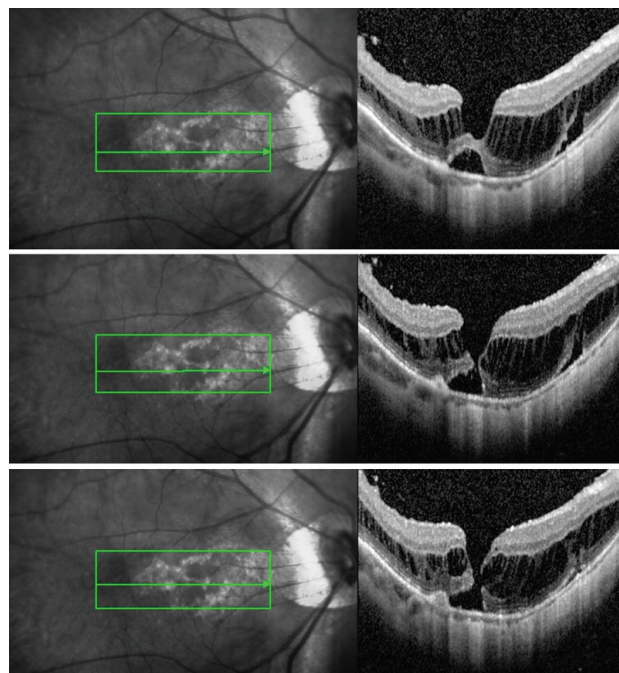


Figure 2. High-resolution and wide view swept-source OCT images demonstrate microstructural changes of the retina and adherent posterior vitreous cortex.

HOW TO PERFORM VITRECTOMY FOR MTM

The exact mechanism for the development of MTM is still unclear, but residual vitreous cortex and ILM may be the main sources of traction. Many studies have reported that vitrectomy with peeling of the ILM or removal of the adherent vitreous cortex resolved myopic retinoschisis and FRD.^{3,11-13} Thus, the surgical strategy for treatment of MTM involves releasing anterior and tangential traction from the adherent vitreous cortex, ERM, and ILM.

Adherent residual vitreous cortex can be visualized with triamcinolone acetonide after removal of the posterior vitreous, which we call the first sheet. After complete removal of the residual vitreous, ILM appears as the second sheet (Video).

ILM peeling for the treatment of MTM remains controversial. ILM peeling incurs the risk of inducing FTMH during vitrectomy or postoperatively, particularly in myopic eyes with FRD. Shimada et al reported that postoperative MH occurred in 16.7% of eyes.¹⁴ Conversely, Ikuno et al have reported favorable results with ILM peeling.¹⁰ We choose to perform ILM peeling for the treatment of MTM to ensure complete removal of the overlying premacular vitreous cortex and ILM, which can be the sources of traction forces. We often performed triamcinolone acetonide- or brilliant blue G–assisted ILM peeling to complete removal of ILM.

Recently, Shimada et al described fovea-sparing ILM peeling for the treatment of MTM, and they reported



WATCH IT NOW

Adherent Vitreous Cortex

Adherent vitreous cortex was peeled initially as a first sheet, followed by peeling of ILM as the second sheet.



fewer postoperative FTMH with that technique compared with conventional vitrectomy with ILM peeling.¹⁴ Further study is needed to confirm the best surgical strategy for MTM.

The adequate choice of tamponade material is also controversial because tamponade material likely affects surgical outcomes to some extent. To achieve anatomic success, air, 20% sulfur hexafluoride (SF₆), 16% perfluoropropane (C₃F₈), or silicone oil should be chosen based on the condition of the fovea and the physical condition of the patient.

BEST TREATMENT STRATEGY UNDETERMINED

Surgical treatment for MTM remains challenging. The time and method of intervention for MTM should be determined based on a detailed evaluation of the foveal microstructures and the patient's condition. New retinal imaging techniques, including swept-source OCT, OCT angiography, and adaptive optics may provide deeper structural information to understand the tractional mechanisms and recovery process of MTM. To confirm the best strategy for the treatment of MTM, further unbiased study is needed. ■

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