



**University of
Zurich**^{UZH}

**Zurich Open Repository and
Archive**

University of Zurich
University Library
Strickhofstrasse 39
CH-8057 Zurich
www.zora.uzh.ch

Year: 2009

Retinal morphologic features in shaken baby syndrome evaluated by optical coherence tomography

Sturm, V ; Landau, K ; Menke, M N

DOI: <https://doi.org/10.1016/j.ajo.2009.02.008>

Posted at the Zurich Open Repository and Archive, University of Zurich

ZORA URL: <https://doi.org/10.5167/uzh-24437>

Journal Article

Originally published at:

Sturm, V; Landau, K; Menke, M N (2009). Retinal morphologic features in shaken baby syndrome evaluated by optical coherence tomography. *American Journal of Ophthalmology*, 147(6):1102-1103.

DOI: <https://doi.org/10.1016/j.ajo.2009.02.008>

CORRESPONDENCE

Retinal Morphologic Features in Shaken Baby Syndrome Evaluated by Optical Coherence Tomography

EDITOR:

WE ENJOYED READING THE STUDY IN WHICH SCOTT AND ASSOCIATES PERFORMED RETINAL IMAGING IN 2 PATIENTS WITH SHAKEN BABY SYNDROME (SBS) USING A HAND-HELD SPECTRAL-DOMAIN OPTICAL COHERENCE TOMOGRAPHY (OCT) DEVICE.¹ THEY PRESENTED A FULL-THICKNESS MACULAR HOLE (MH) WITH FULL-THICKNESS RETINAL SCARRING AND EPIRETINAL MEMBRANE (ERM) FORMATION AS THE SEQUELAE OF SBS.

THE PURPOSE OF THIS LETTER IS NOT TO CRITICIZE THIS EXCELLENT STUDY, BUT TO DISCUSS RELATED ASPECTS AND TO PROVIDE ADDITIONAL FINDINGS. THE UNDERLYING PATHOPHYSIOLOGY OF MH FORMATION IN INFANTS SEEMS TO BE MULTIFACTORIAL AND COMPLEX. MECHANICAL FORCES RESULTING FROM THE SHAKING ITSELF LEAD TO A STRUCTURALLY WEAKENED RETINA. OTHER FACTORS SUCH AS NECROSIS AND MECHANICAL PRESSURE ARE RELATED TO RETINAL HEMORRHAGES AND MAY CONTRIBUTE TO THE CAUSE.

HOWEVER, VITREORETINAL TRACTION MAY PLAY A KEY ROLE IN THE PATHOLOGIC FEATURES OF SBS-RELATED RETINAL FINDINGS SUCH AS PERIMACULAR FOLDS, TRAUMATIC RETINOSCHISIS, ERM, AND MH FORMATION.^{2,3} AS SHOWN BY THE AUTHORS, PARTIAL POSTERIOR HYALOID SEPARATION WAS ASSOCIATED WITH A LAMELLAR MH IN 1 EYE. VITREOMACULAR TRACTION RESULTING FROM INCOMPLETE POSTERIOR VITREOUS DETACHMENT HAS BEEN ATTRIBUTED TO CAUSE MHS.^{4,5} FURTHERMORE, OCT DEMONSTRATED EXTENSIVE VITREORETINAL TRACTION IN 3 PATIENTS WITH SBS THAT WAS PARTIALLY NOT SEEN IN OPHTHALMOSCOPY.⁶ RECENTLY, OUR GROUP PERFORMED A 2-YEAR FOLLOW-UP EXAMINATION OF A CHILD WITH SBS. OCT REVEALED ERM FORMATION IN THE MACULAR AREA. HOWEVER, IN THIS CASE THE FOVEA WAS NOT DIRECTLY AFFECTED.

IN THE STUDY OF SCOTT AND ASSOCIATES, THE OTHER CHILD SUSTAINED A DOUBLE-LAYERED ERM. AS THE AUTHORS POINTED OUT, THE PERSISTING SECOND REFLECTIVE PRERETINAL LAYER CAN BE EXPLAINED AS A PARTIALLY DETACHED INTERNAL LIMITING MEMBRANE (ILM). BECAUSE OF THE STRONG ADHERENCE OF THE VITREOUS BODY TO THE ILM IN CHILDREN, THE SHAKING MAY INDUCE A SEVERE VITREORETINAL TRACTION FORCE LEADING TO SEPARATION OF THE ILM FROM THE NEUROSENSORY RETINA. IN THE STUDY OF SCOTT AND ASSOCIATES, SEVERE FOVEAL DEFORMATION WAS SEEN AT THE SITE OF PERSISTING VITREOUS ATTACHMENT. INTERESTINGLY, IN THIS PATIENT ONLY MILD RETINAL HEMORRHAGES WERE PRESENT. THIS MAY SUPPORT THE HYPOTHESIS THAT VITREORETINAL TRACTION IN FACT MAY BE MORE IMPORTANT FOR MH FORMATION IN SBS COMPARED WITH OTHER FACTORS SUCH AS NECROSIS AND MECHANICAL PRESSURE THAT ARE RELATED TO RETINAL HEMORRHAGES.

IN ADDITION, THE AUTHORS NOTED THE POTENTIAL DIAGNOSTIC MEANING OF PERIMACULAR FOLDS AND TRAUMATIC RETINOSCHISIS, BUT WERE UNABLE TO SHOW ACCORDING OCT IMAGES. SUCH FINDINGS PREVIOUSLY WERE DEMONSTRATED WITH TIME-DOMAIN OCT.⁶ HOWEVER, IN OUR PATIENT GROUP, NO MHS WERE OBSERVED.

IN CONCLUSION, OCT CAN IDENTIFY ADDITIONAL RETINAL FINDINGS WHICH EASILY CAN BE MISSED BY BIOMICROSCOPY ALONE. MORPHOLOGIC FEATURES SEEN BY OCT MAY ELUCIDATE FURTHER THE PATHOPHYSIOLOGIC FEATURES OF SBS. OCT SEEMS TO BE A SUITABLE TOOL IN DIAGNOSIS AND FOLLOW-UP OF CHILDREN WITH SUSPECTED SBS.

VEIT STURM
KLARA LANDAU
MARCEL N. MENKE
Zurich, Switzerland

REFERENCES

1. Scott AW, Farsiu S, Enyedi LB, Wallace DK, Toth CA. Imaging the infant retina with a hand-held spectral-domain optical coherence tomography device. *Am J Ophthalmol* 2009;147:364–373.
2. Mungan NK. Update on Shaken Baby syndrome: ophthalmology. *Curr Opin Ophthalmol* 2007;18:392–397.
3. Levin AV. Retinal hemorrhages and child abuse. In: David TJ, editor. *Recent Advances in Paediatrics*. London, England: Churchill Livingstone, 2000:151–160.
4. Munera JM, Garcia-Layana A, Maldonado MJ, et al. Optical coherence tomography in successful surgery of vitreomacular traction syndrome. *Arch Ophthalmol* 1998;116:1388–1389.
5. Meyer CH, Mennel S. Vitreomacular traction, macular hole formation, and subfoveal choroidal neovascularization in a patient with age-related macular degeneration. *Eye* 2006;20:1090–1092.
6. Sturm V, Landau K, Menke MN. Optical coherence tomography findings in Shaken Baby syndrome. *Am J Ophthalmol* 2008;146:363–368.

REPLY

WE APPRECIATE THE INSIGHTFUL ARTICLE BY STURM AND ASSOCIATES REGARDING THEIR APPLICATION OF OPTICAL COHERENCE TOMOGRAPHY (OCT) AND DISCUSSION OF VITREOMACULAR TRACTION IN SHAKEN BABY SYNDROME (SBS).¹ THEY DOCUMENT A SHARP WHITE-FOLD ON COLOR PHOTOGRAPH OF THEIR FIRST PATIENT, AND ON TIME-DOMAIN OCT SHOW DEFORMATION OF THE RETINA AT A SITE OF VITREOUS ATTACHMENT TO AN EPIRETINAL MEMBRANE (ERM) WITH SMALL, ROUND HYPOREFLECTIVE SITES IN THE INNER RETINA. WE AGREE THAT VITREORETINAL TRACTION MAY PLAY A KEY ROLE IN THE PATHOLOGIC CHARACTERISTICS OF SBS; HOWEVER, AS