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Commentary

The Hidden Pattern: Decoding Binasal Visual Field Defects

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DESCRIPTION

Binasal visual field defects represent a rare and intriguing pattern of vision loss that challenges clinicians due to their diverse etiologies and subtle presentation. Unlike the more common bitemporal hemianopia, which strongly suggests chiasmal compression, binasal hemianopsia does not point to a single predictable lesion site. Instead, it acts as a diagnostic puzzle, often indicating pathology at multiple levels of the visual pathway including the retina, optic nerve, and even systemic or vascular influences. Because of its rarity, it is frequently underrecognized or misinterpreted, and this can delay treatment of potentially reversible conditions.

In clinical practice, binasal field loss may arise from anything that disrupts the conduction of retinal nerve fibers originating from the nasal retina of both eyes. These fibers correspond to the temporal visual fields, meaning that patients often present with difficulty navigating peripheral environments or noticing objects approaching from the sides. However, the experience can be subtle, and many individuals accommodate without realizing significant deficits until visual field testing is performed. Optical Coherence Tomography (OCT), Magnetic Resonance Imaging (MRI), and fundus examination often become critical tools in uncovering the hidden causes.

This commentary explores the multifactorial origins of binasal visual field defects and emphasizes how clinicians can decode this unusual pattern by integrating structural, functional, and systemic clues. The goal is to highlight the importance of detailed clinical evaluation and advocate for broader awareness of this overlooked but clinically meaningful visual field abnormality. Binasal visual field defects frequently originate from conditions affecting the optic nerve head, particularly those involving crowding or compression at the level of the optic nerve. One of the most recognized causes is bilateral optic nerve head drusen. These calcified deposits progressively compress optic nerve fibers, especially those entering from the nasal retina. Because nasal fibers run temporally within the optic nerve before joining the optic tract, they are particularly vulnerable to mechanical distortion. Patients with optic disc drusen often have stable visual function for years before small scotomas coalesce into a binasal pattern. OCT imaging typically reveals irregularities in the optic nerve head contour, while autofluorescence confirms the presence of drusen. Importantly, this etiology demonstrates that binasal defects may develop slowly and silently, reinforcing the necessity of routine screening for individuals at risk.

Another critical mechanism behind binasal hemianopsia involves glaucomatous optic neuropathy, especially in cases where damage to the nasal retinal nerve fiber layer progresses asymmetrically. While glaucoma traditionally affects the arcuate bundles, advanced disease can compromise fibers in non-typical zones, including the papillomacular and nasal sectors. In such cases, bilateral involvement produces a binasal pattern, especially when the inferior and superior arcuate bundles in both eyes converge into areas of field loss that appear nasal on automated perimetry. This highlights that not all glaucomatous field defects follow classical patterns, and clinicians must remain alert to atypical configurations. Optical Coherence Tomography (OCT), Retinal Nerve Fiber Layer (RNFL) analysis often serves as a decisive tool in mapping the structural damage underlying these visual field changes.

Sinus-related pathologies, particularly ethmoid or sphenoid sinus disease, can also produce binasal visual field defects via bilateral compressive effects on the optic nerves. Conditions such as chronic sinusitis, mucoceles, or bony remodeling exert pressure on the medial optic nerve segments, which house the fibers corresponding to the nasal field. Because the medial walls of the optic canals are thin, even mild expansion can induce compression. These cases underscore the importance of correlating visual field defects with subtle craniofacial symptoms, including persistent sinus pressure, headaches, or nasal congestion. Optical Coherence Tomography (OCT) and Magnetic Resonance Imaging (MRI) imaging frequently reveal the underlying cause, and timely management by otolaryngologists can lead to significant visual recovery if compression is reversed early.

Vascular abnormalities also play a surprisingly prominent role in the development of binasal field defects. Atherosclerotic changes, particularly those affecting the ophthalmic or internal carotid circulation, can compromise blood flow to the medial aspects of the optic nerves, leading to ischemic damage. Non-arteritic Anterior Ischemic Optic Neuropathy (NAION) may produce an altitudinal defect in one eye, but simultaneous or sequential involvement of both optic nerves in a nasal

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distribution can produce a binasal pattern. The vascular hypothesis becomes even more prominent in systemic diseases such as diabetes or hypertension, where microvascular compromise affects multiple anatomical sites simultaneously. These cases emphasize the importance of vascular risk factor evaluation, as systemic optimization may prevent progression or recurrence.

Retinal pathologies involving the nasal retina itself also contribute significantly to binasal field loss. One such condition is bilateral retinitis pigmentosa variants or inherited retinal dystrophies that begin peripherally and may initially manifest as localized nasal retinal dysfunction. Although classic retinitis pigmentosa affects the mid-peripheral retina and progresses concentrically, some genetic variants display asymmetric progression that disproportionately affects the nasal retina. Additionally, congenital anomalies such as colobomas or retinal thinning can selectively impair nasal retinal structure and function. Fundus examination and OCT can provide detailed mapping of the affected areas, aiding in the differentiation between retinal and optic nerve causes of binasal field defects.

A particularly noteworthy but less frequent cause of binasal hemianopsia is chiasmal lesions that spare the crossing nasal fibers but affect the non-crossing temporal fibers. For instance, lateral compressive lesions such as internal carotid artery aneurysms, meningiomas, or parasellar masses may compress the lateral aspect of the optic chiasm. Unlike pituitary adenomas, which primarily compress the central chiasm and produce bitemporal defects, lateral lesions affect the non-decussating fibers, resulting in binasal field loss. These cases illustrate the critical role of neuroimaging in evaluating unexplained field defects, as subtle parasellar masses may go unnoticed without dedicated imaging. Early detection can be vision-saving and, in many cases, life-saving.

In addition to structural and vascular causes, optical factors such as corneal or lens irregularities can create artifactual binasal defects on perimetry. Significant astigmatism, corneal scars, narrow palpebral fissures, or poorly fitting refractive correction can cause shadowing that mimics nasal field loss. Cataracts, particularly anterior cortical opacities, can interfere with peripheral light transmission, producing inconsistencies in visual field testing. Recognizing artifactual patterns is essential to avoid unnecessary investigations and ensure accurate diagnosis. Repeat testing under optimal conditions or using alternative perimetric techniques often resolves these misleading findings.

Neurological disorders, particularly those involving demyelination such as multiple sclerosis, may also produce binasal defects through bilateral, asymmetric optic neuritis. Although optic neuritis typically causes diffuse vision loss, selective involvement of nasal fibers in both eyes can generate a binasal pattern. These patients often present with pain on eye movement, reduced color vision, and fluctuating symptoms. OCT can reveal thinning of the nasal RNFL sectors, while MRI may show demyelinating plaques along the optic nerves or chiasm. These cases underscore the importance of considering inflammatory or demyelinating disease when binasal defects appear in younger patients.

A final key factor in decoding binasal visual field defects is the interplay between structural imaging and functional testing. OCT, perimetry, and MRI each provide unique data points, but clinical decisions hinge on synthesizing these findings in the context of the patient's symptoms and systemic health. The complexity of binasal field defects demands a holistic approach, where subtle clinical clues mild optic nerve pallor, sinus tenderness, vascular risk factors, or family history can direct the diagnostic pathway. The rarity of binasal hemianopsia means that clinicians must remain vigilant and maintain a broad differential diagnosis, as early identification can dramatically alter outcomes.

CONCLUSION

Binasal visual field defects represent an underappreciated yet clinically meaningful pattern that reveals a wide spectrum of ocular, neurological, retinal, sinus-related, and systemic pathologies. Unlike more classic field defects that point clinicians toward predictable lesion sites, binasal loss challenges the practitioner to consider multiple anatomical regions, from the retina to the optic nerve to the optic chiasm. The diversity of potential etiologies reinforces the need for a multimodal diagnostic approach, integrating visual field analysis, OCT, neuroimaging, and detailed systemic evaluation.

Early recognition of this hidden pattern can prevent irreversible vision loss, particularly when the cause is reversible such as sinus compression, vascular insufficiency, or inflammatory processes. Even in cases related to chronic degenerative conditions like glaucoma or optic nerve head drusen, timely intervention can slow progression and preserve functional vision. Ultimately, binasal hemianopsia serves as a reminder that subtle visual field changes may signal significant underlying disease and that attention to rare patterns can significantly enhance clinical care.