

Mapping Academic Collaboration in Skull Base Surgery: The Sekhar Number Project



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Introduction

- Paul Erdős was a highly prolific mathematician whose extensive coauthorship network led to the concept of the Erdős number, a measure of academic distance defined by shared publications.
- Skull base surgery is a multidisciplinary and highly collaborative field, well suited to network-based analysis.
- Laligam N. Sekhar is among the most prolific and influential contributors in skull base surgery, particularly during the early development of the field.
- We applied an Erdős-style framework to quantify collaborative distance from Sekhar among members of the North American Skull Base Society (NASBS).

Methods and Materials

- The NASBS member directory was used to define the study cohort.
- Author name variants were systematically queried in PubMed across all indexed years.
- A coauthorship graph was constructed in which:
 - Nodes represent authors
 - Edges represent shared publications
 - Edge weights equal the number of coauthored papers
 - Articles with excessive author counts or consortium attribution were excluded to avoid distortion of network structure.
- Data were stored in a cloud-hosted MongoDB database, with ingestion performed using distributed R-based workers to enable scalable processing.
- The shortest path from each author to Sekhar defined the "Sekhar number."

Results

- A total of 1,388 NASBS members were identified.
- 1,357 authors (97.8%) were connected to Sekhar within the collaboration graph.
- 107 authors were directly connected to Sekhar (Sekhar-1).
 - Most frequent collaborators included:
 - Chandranath Sen (35 publications)
 - Ivo Janecka (27)
 - Isaac Abecassis (15)
 - Dinesh Ramanathan (15)
- The majority of members were separated by only two degrees:
 - Sekhar-2: 1,157 authors (83.5%)
 - Sekhar-3: 91 authors
 - Sekhar-4: 2 authors
- Only 32 members had no definable coauthorship path.

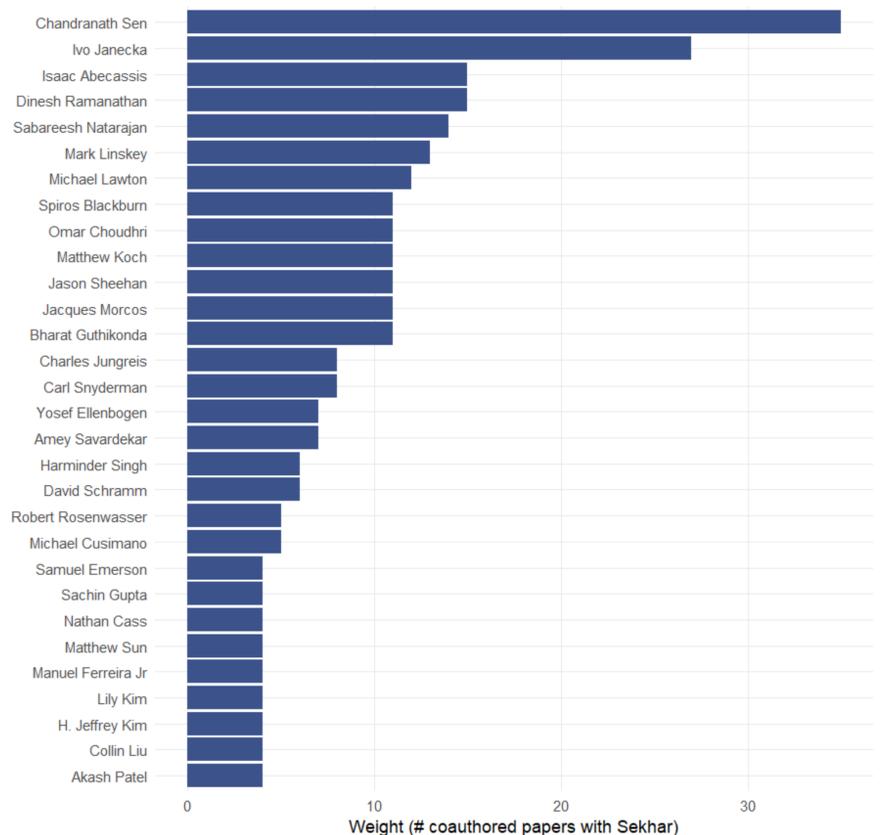


Figure 2. Top 25 Sekhar-1 collaborators by coauthorship weight.

Discussion

- Nearly all NASBS members lie within two collaborative steps of Laligam N. Sekhar, underscoring his central role in the literature.
- The steep drop-off in distance and the high coauthorship weights reflect a dense, tightly connected academic network.
- These findings highlight collaboration as a defining structural feature of skull base surgery.

Interactive Visualization

Explore individual Sekhar numbers and collaboration paths:

https://aalattar.shinyapps.io/sekhar_number2



Acknowledgments

In memory of Karenna Groff.

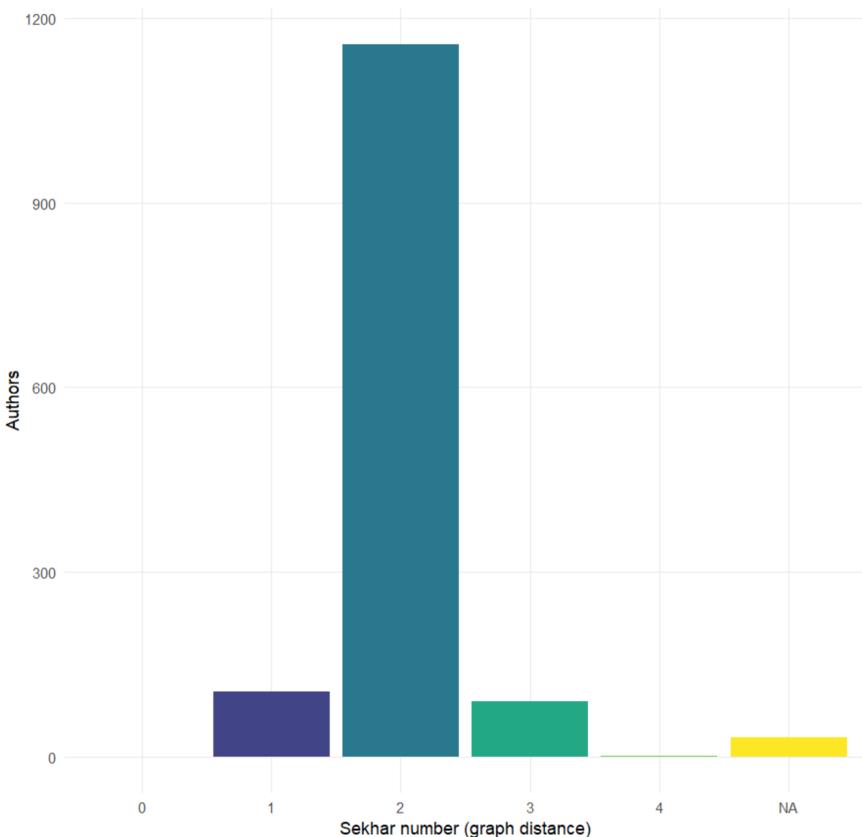


Figure 1. Distribution of Sekhar numbers among NASBS members.

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