

Nerve Surgeons' Assessment of the Role of Eduard Pernkopf's Atlas of Topographic and Applied Human Anatomy in Surgical Practice

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INTRODUCTION

- Pernkopf's Atlas of Anatomy is controversial due to its origination during the Third Reich, yet has surgical application by depicting intricate nerve anatomy
- Inquires in the 1980's resulted in the **Senatorial Project of the University of Vienna** (1998) and subsequent removal of the atlas from print, though it continues to circulate in the used book market without disclosure
- The **purpose of this study** is to (1) assess the role of Pernkopf's atlas in nerve surgeons' current practice and (2) determine whether an ethical proposal may provide possible guidance for its use in surgery and surgical education

MATERIALS & METHODS

- An **electronic questionnaire** was sent to members of the American Society for Peripheral Nerve (ASPN) and PASSIO Education (passioeducation.com)
- The survey introduced respondents to the origin of Pernkopf's atlas, assessed surgical utility, and asked for recommendations on ethical handling
- This involved development of a **4-point proposal** to address current issues as part of an international effort (see "Survey Questions" table)

RESULTS (Demographics)

- 206 responses were collected (25% response rate, 77% completion rate)
- 83% male, 17% female; 26-73 years old
- 15% resident physicians, 11% fellows, 74% practicing surgeons
- 61% received residency training in plastic & reconstructive surgery

Please see the following tables & figures for survey answers regarding patterns of use, whether or not to use Pernkopf's atlas in nerve surgery (including the four-point proposal), Netter's versus Pernkopf's anatomical plate comparison, and type of anatomical atlases used in nerve surgery

Type of Anatomical Atlases Used	Proportion
Netter's Atlas of Human Anatomy	81%
Gray's Atlas of Anatomy	49%
Grant's Atlas of Human Anatomy	31%
Sobotta's Atlas of Human Anatomy	24%
Pernkopf's Atlas of Topographical & Applied Human Anatomy	22%
Thieme's Atlas of Anatomy	13%
Rohen's Photographic Color Atlas of Anatomy	12%
Other	10%
Lippincott Williams & Wilkins' Atlas of Anatomy	7%
Morris' Human Anatomy: A Complete Systematic Treatise	2%

Survey Questions	Total N=182		Practicing Surgeons N=108		Surgical Trainees N=42		Jewish N=20	
	Yes	No	Yes	No	Yes	No	Yes	No
Are you aware of Eduard Pernkopf's Atlas of Topographical and Applied Human Anatomy?	59%	41%	57%	43%	52%	48%	65%	35%
L Have you previously used Pernkopf's atlas?	41%	59%	45%	55%	41%	59%	39%	62%
L Are you currently using Pernkopf's atlas?	22%	79%	23%	77%	18%	82%	8%	92%
L Are you aware of the history behind the creation of Pernkopf's atlas?	77%	23%	77%	23%	82%	18%	92%	8%
Little, some, great deal								
L What is your level of knowledge concerning the improper actions of some German physicians during the Third Reich?	10%, 66%, 24%		8%, 60%, 31%		17%, 78%, 6%		0%, 42%, 58%	
Yes, undecided, no								
L Do you prefer to use an alternative anatomical resource because of your knowledge of the history of Pernkopf's atlas?	29%	71%	35%	65%	6%	94%	75%	25%
Historical Presentation of Pernkopf's Atlas of Topographical and Applied Human Anatomy								
Yes, undecided, no								
Based upon this information, would you be comfortable using Pernkopf's atlas as a reference material?	69%, 17%, 15%		62%, 18%, 20%		81%, 17%, 2%		40%, 15%, 45%	
Would you use Pernkopf's atlas if which of the following conditions are met:								
	Use	Not Use	Use	Not Use	Use	Not Use	Use	Not Use
L A formal and educational disclosure displayed prior to viewing the atlas discussing its historical origin and ethical discussion.	38%		32%		55%		25%	
L A consensus from bioethics validating its specific use for benefiting the lives of patients.	31%		25%		38%		10%	
L A consensus validating its use from Bet Din (Jewish religious rabbinical court) and consistent with the Jewish ethical principle of <i>Pikeuach Nafesh</i> in that preservation of human life overrides virtually any other religious consideration.	17%		14%		24%		15%	
L An official memorial existed, which was dedicated to the victims of the atlas.	20%		16%		29%		15%	
L All of the above.	22%		22%		19%		30%	
L None of the above. I would use Pernkopf's atlas regardless of the above conditions.	29%		32%		19%		10%	
L None of the above. I would NOT use Pernkopf's atlas		10%		8%		0%		25%
Comfortable, undecided, uncomfortable, no opinion								
* Given the controversial history of Pernkopf's atlas and having met all ethical and moral conditions provided above, how would you feel about specific Pernkopf's plates to accompany a surgical education resource as important anatomical landmarks with specific conditions?	81%, 8%, 6%, 6%		77%, 7%, 10%, 6%		88%, 5%, 0%, 7%		47%, 13%, 27%, 7%	
Yes, undecided, no								
* Given the controversial history of Pernkopf's atlas and having met all ethical and moral conditions provided above, would you allow for the specific use of the atlas by other surgeons in the treatment of patients with devastating nerve injuries?	33%, 11%, 56%		33%, 22%, 44%		No responses		20%, 60%, 20%	

Key: L – survey logic which displays the question to the participant based on the previous proper question (e.g. "yes" to the "awareness" question displays the question of "previous use"). Therefore, denoted survey answers are a subpopulation of the previous proper question (e.g. "41% yes" to "previous use" question is a subpopulation of the "59% yes" of the "awareness" question). * - survey logic specific to the "use" group. ** - survey logic specific to the "not use" group.

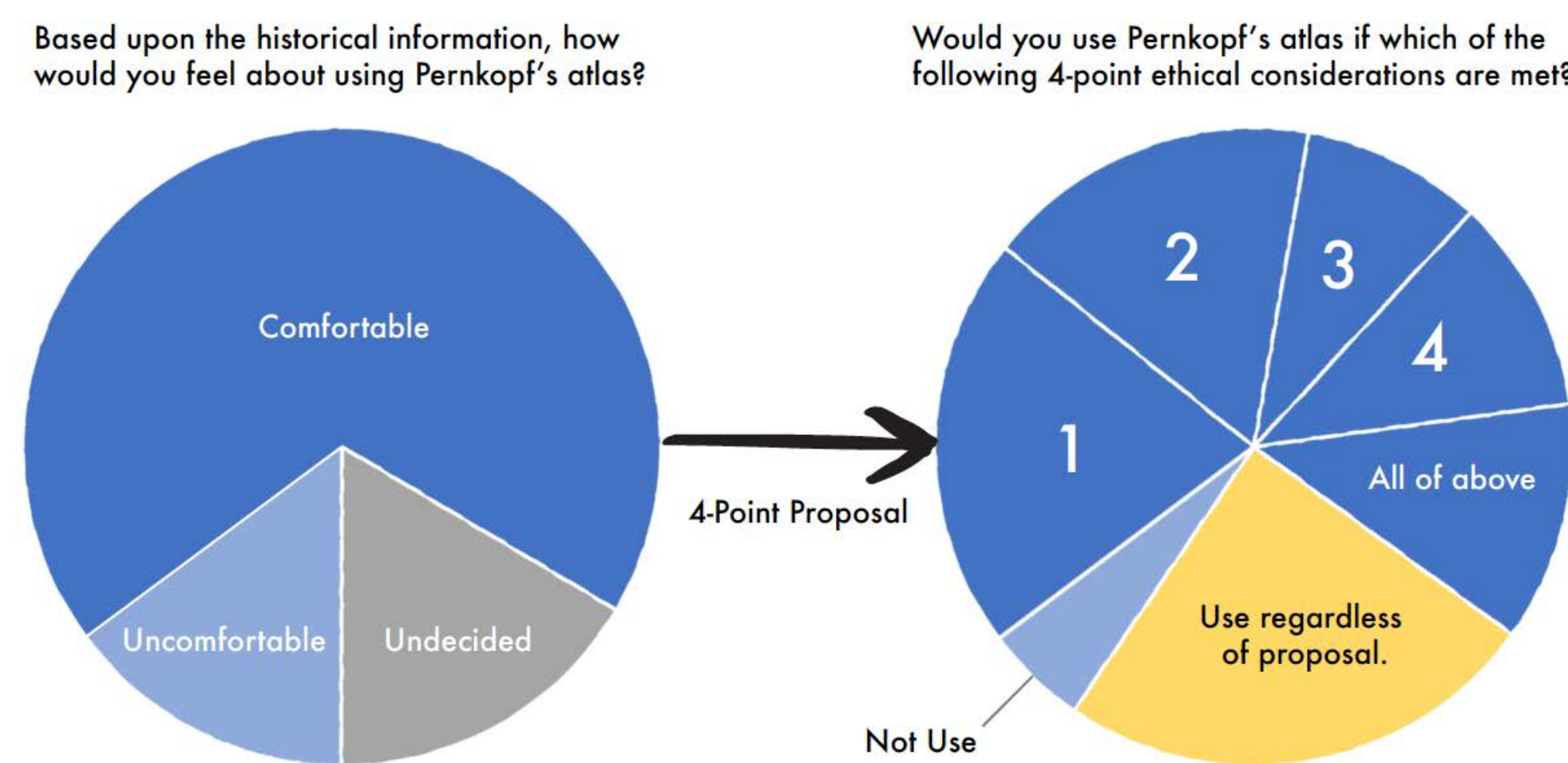


Figure 1. An assessment of Pernkopf's atlas in nerve surgery and the influence of the 4-point ethical proposal on the use of Pernkopf's atlas for surgery and education.

Anatomical Plate Description	Greater Anatomical Detail			Greater Surgical Utility		
	Pernkopf	Netter	p-value	Pernkopf	Netter	p-value
Facial nerve and distal branches.	91%	5%	p < 0.001	82%	14%	p < 0.001
Spinal accessory, brachial plexus, and phrenic nerves.	90%	6%	p < 0.001	75%	21%	p < 0.001
Axillary nerve and its superior lateral cutaneous branch in relation to the radial nerve.	86%	7%	p < 0.001	82%	13%	p < 0.001
Palmar and digital cutaneous branches of the median and ulnar nerves.	82%	6%	p < 0.001	80%	13%	p < 0.001
Subcostal, iliohypogastric, ilioinguinal, genitofemoral, and lateral femoral cutaneous nerves.	79%	12%	p < 0.001	66%	20%	p < 0.001
Femoral nerve and the saphenous nerve in relation to anteromedial intermuscular septum.	91%	6%	p < 0.001	79%	15%	p < 0.001

DISCUSSION & CONCLUSIONS

- This is the first discussion regarding whether "to use or not to use" Pernkopf's atlas in nerve surgery
- The **4-point ethical proposal** improved acceptance regarding the use of the atlas in surgery under specific guidelines (Fig. 1)
- A transition of 76% of "uncomfortable" and "undecided" to possible atlas use occurred with the proposal
- 29% of respondents would use Pernkopf's atlas regardless of the ethical proposal
- Netter's represents the most popular atlas (81%), while only 22% prefer Pernkopf's (though voted superior in anatomical detail and surgical utility)
- There continues to exist a division in opinion on whether this detailed atlas can be used to benefit the lives of patients in surgery and education