

Orthopedic Practice and Training of Family Physicians: A Survey of 302 North Carolina Practitioners

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A mailed survey questionnaire was distributed to the North Carolina Academy of Family Physicians to assess their orthopedic training and their opinions of the orthopedic training of resident physicians in family practice. Approximately 300 questionnaires were analyzed and the spectrum of orthopedic activities in office, hospital, and community were tabulated. There was no significant geographic variation in practice within the state for these variables, but there were statistically significant differences between rural and suburban-urban family physicians in their management and referral practice of several patient problems. Seventy percent of respondents thought that their training in orthopedics was appropriate to their present practice, but half felt that their training was inadequate. Most of the respondents (57 percent) had less than one month of postgraduate training in orthopedics. The majority (68 percent) recommended some postgraduate training in orthopedics, with about 50 percent recommending one to three months of postgraduate training. The mail survey questionnaire is proposed as a useful aid in curricular design in family practice.

The proliferation of residency training programs in family practice since the establishment of this new specialty in 1969 poses a unique problem in postgraduate medical education. No other specialty requires the breadth of knowledge and skills in the traditional clinical discipline as are required in the new academic discipline of family medicine.

Curricular design for family practice requires delineation of the boundaries of this new specialty by problem-orientation.¹ A possible approach to curricular design is to survey practicing family physicians concerning the patient problems they manage and refer, the adequacy and appropriateness of their training for these problems, and the medical needs and resources of their communities.

This approach may be complicated by geographic or demographic variables, such as the availability of other specialists and hospital facilities. The present survey was designed to apply such an approach in a limited fashion. It assesses the current orthopedic practice and training of family physicians in North Carolina and, in addition, explores possible geographic and demographic variations in practice and training within the state.

Methods

A one-page multiple-choice questionnaire was mailed first class to the approximately 850 member mailing list of the North Carolina Academy of Family Physicians in June 1975. A stamped, self-addressed envelope was enclosed with each questionnaire, along with a form letter explaining that the data would be of value in family practice education, plus an endorsement by the current president

of the NCAFP. The questionnaire is reproduced in Table 1. Respondents were indexed by county of practice into the three geographic regions of the state: mountains, Piedmont plateau, and coastal plain. Information from the first 300 questionnaires returned was numerically coded, punched on cards, and analyzed by the Division of Biostatistics, Department of Community Health Sciences, Duke University.

In addition to descriptive statistics, several cross tabulations were performed and tested by chi square to determine:

1. Do respondents who indicated that their principal postgraduate training was in family practice differ significantly from other respondents in the spectrum of orthopedic problems managed in office, hospital, and community, in their orthopedic training, or in their views on orthopedic training for family physicians?

2. Do respondents who indicated that their practice was predominantly rural manage a significantly different percentage or spectrum of orthopedic problems than urban or suburban family physicians?

3. Is there significant geographic variation in the spectrum of orthopedic practice, training, or opinions on orthopedics in family practice among family physicians surveyed in North Carolina?

Results

Of the approximately 850 questionnaires mailed, 317 were returned and 302 tabulated. This response rate of 37.8 percent may not reflect the true response rate of practicing physicians, since an unknown portion of the NCAFP mailing list are not practicing family physicians.

Table 1 displays the data for the 302 physicians responding to the sur-

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vey. The total number of categorical responses for each question is denoted by *n*. The proportion of affirmative responses to that total is expressed as a percentage. For "year of graduation" and "years in present practice" the mean and median coincided within one year and are expressed as *m*. The range in years is given in parentheses.

The question on extent of orthopedic training was answered by 264 physicians. The percentage of answers in each category is indicated in Table 1. However, 61 of these physicians gave two responses to this question. In all but four cases, the second answer was presumably an indication of postgraduate training in addition to stated medical school, and 24 of them (39.3 percent) indicated one to three months of post-medical school training in orthopedics. Only two of the 61 (3.3 percent) indicated more than three months of orthopedic training in addition to medical school.

Similarly, 45 respondents gave multiple answers to the question on the extent of orthopedic training recommended for family practice residents. Most of these (97.8 percent) had indicated additional training after medical school, with 33 of these 45 (73.3 percent) recommending one to three months of postgraduate orthopedics in addition to a variable amount of medical school training.

The question on principal postgraduate training was answered by 258 physicians. Thirty-four physicians (13.2 percent of those responding) listed family practice as a first answer. An additional 68 physicians gave a second answer to this question, and of these 20 (29.4 percent) indicated family practice as secondary postgraduate training. Only the 34 specifying family practice as a first answer were included in tabulations.

A comparison of the 34 physicians who listed their principal postgraduate training as family practice with 29 physicians who listed their principal training as internal medicine was attempted to determine if family practice training affected the spectrum of orthopedic activities or attitudes. There were no statistically significant differences between the two groups in their response to questions regarding the adequacy and appropriateness of their orthopedic training or their management and referral habits.

Of 253 respondents, 115 (45.5

percent) indicated that their practices were rural. These rural family physicians were compared as a group to 138 urban and suburban family physicians regarding the percentage of their practice which they considered orthopedic. The distribution of answers did not differ significantly between the two groups. However, there were statistically significant differences in the spectrum of orthopedic problems treated as reported by these two groups. Closed fractures, phalangeal and tarsal fractures not involving joints, and extremity wounds not involving nerves, arteries, or tendons were managed without orthopedic consultation by a significantly greater fraction of rural family physicians than urban-suburban practitioners. Significantly more rural family physicians reported that they participated as team physicians in high school athletics, took part in training local rescue squads, and used paramedical assistance in plaster application. Conversely, significantly more urban and suburban family physicians reported that they were treating rheumatoid arthritis and that they were performing diagnostic aspiration and therapeutic injection of joints without orthopedic consultation. Statistical significance in all cases was determined by a chi square value indicating less than five percent probability of representing chance variation.

Indexing 292 responding family physicians by county of practice into the three regions of the state gave the following geographic distribution: mountains, 39; Piedmont, 186; coastal plain, 67. There were statistically significant differences in responses to questions on extremity wounds involving nerves, arteries, or tendons, bunions; operating or assisting at orthopedic surgery; and appropriateness of orthopedic training. When influence of population density on geographic variation in practice was eliminated, by comparing rural family physicians and urban-suburban family physicians separately within the three regions, no statistically significant differences remained.

Discussion

In 1953 and 1954, an extensive survey of general practice in North Carolina indicated that "surgical problems" accounted for a minimum of 10.7 percent of patients seen by

general practitioners in towns of 50,000 or more persons and for as much as 20.7 percent of patients in towns of 1,000 to 2,499 persons. The classification "surgical problems" was not further subdivided; however, the authors state that "...most of the surgery performed in general practice is minor, dealing with bruises, cuts, abrasions, minor burns, and less with fractures, dislocations and more serious maladies."² Excerpts from a survey of diagnoses in 15,419 patient visits to 91 North Carolina general practitioners in this same study indicated that musculoskeletal conditions constituted less than ten percent of patient visits in 1953-1954.²

The present survey also indicates that the majority of respondents (67 percent) estimated that orthopedic problems constituted less than ten percent of their practice, although 29 percent indicated that 10 to 20 percent of their practice was orthopedic in nature. The present study does not indicate a statistically significant difference in the percentage of orthopedics seen in rural vs suburban-urban practices.

Although rural practice did not appear to increase significantly the fraction of orthopedics in family practice as the Peterson study suggests for surgical problems in general, the spectrum of orthopedic problems managed without referral in rural and suburban-urban practice differed significantly. The data collected in this study suggests that North Carolina rural family physicians manage more musculoskeletal trauma without referral, while their suburban and urban counterparts manage more arthritic problems without referral. Rural practice seems to require or encourage a greater participation in community-oriented orthopedics, eg, high school athletics and rescue squad training. The distribution of orthopedic surgeons in the state, and the spectrum of their practices may be an influential factor in these differences, although there was no significant difference in the fraction of rural and suburban-urban family physicians who claimed a close working relationship with an orthopedic surgeon.

The orthopedic training of family physicians was not specifically considered in the Peterson study; however, the length of surgical training of 76 North Carolina general practi-

tioners was tabulated. Sixteen had less than three months' surgical training, 26 had three months, 15 had four months, 10 had five to eight months, and seven had more than eight months of postgraduate surgical training.² The present survey indicates that most family physicians surveyed had less than three months of postgraduate training in orthopedics with some exposure to this discipline in medical school. The extent of orthopedic training among the North Carolina family physicians surveyed may be greater than indicated in Table 1 because of the multiple answers by 61 respondents mentioned above. In all cases, only the first answer (and, thus, the one indicating the least amount of training) was included in tabulations.

Only 162 respondents answered the question, "Do you think your orthopedic training was appropriate to your present practice?" Since this question and the one preceding it on adequacy of orthopedic training were presented together on the questionnaire, it is possible that some respondents thought that only one answer was intended. Seventy percent of these 162 respondents felt that their training was appropriate, but only half of the 255 respondents to the adequacy question felt that they had had enough training for their present practice. Sixty-eight percent of respondents felt that some postgraduate training in orthopedics was necessary and the majority (50 percent) recommended one to three months. Many respondents added comments that the training should be individualized to the practice anticipated.

The influence of geographic locale on spectrum of orthopedics appears to be almost solely a function of the influence of geography on population distribution. The Piedmont area contained 73.3 percent of the suburban and urban family practices indexed. Of responding family physicians, 67.9 percent from the mountain region were in rural practice, while only 53.4 percent of those from the coastal plain and 37.7 percent of those from the Piedmont were rural practitioners. Nevertheless the majority (52.3 percent) of rural practitioners were respondents from the Piedmont region, reflecting the distribution of all family physicians responding statewide - 64.9 percent from the Piedmont.

The postgraduate educational pro-

Table 1. Orthopedic Survey Questionnaire - NCAFP, July 1975

Check any of the following that you commonly manage in your practice without orthopedic consultation or referral: (n=302)

1.	Ankle sprain	96.0%
2.	Closed fractures of radius or ulna	52.6%
3.	"Pigeon toes" in children	14.6%
4.	Dislocated shoulder	47.7%
5.	Low back pain	92.4%
6.	Idiopathic scoliosis	19.2%
7.	Hand infections	78.8%
8.	Extremity wounds not involving nerves, arteries, or tendons	91.4%
9.	Extremity wounds involving nerves, arteries, or tendons	6.3%
10.	Osteoarthritis	92.4%
11.	Rheumatoid arthritis	92.7%
12.	"Bursitis"	97.0%
13.	Open fractures	2.3%
14.	Bunions	19.5%
15.	Internal fixation of fractures	2.0%
16.	Phalangeal and tarsal fractures not involving joints	73.5%
17.	Prescription for corrective shoes or orthopedic appliances	23.5%
18.	Aspiration or injections of joints	81.5%
19.	Osteomyelitis	24.2%
20.	Initial care of severely traumatized patients	50.7%

Have you in your practice (n=302)

1.	Utilized the services of a registered physical therapist?	82.1%
2.	Used paramedical assistance in wound care or cast application?	32.8%
3.	Had a close working relationship with an orthopedist or group?	81.5%
4.	Acted as a team physician for high school athletics?	52.0%
5.	Skipped orthopedic articles in the journals you read regularly?	30.5%
6.	Instructed your local rescue squad in the management of musculoskeletal trauma?	23.5%
7.	Obtained any additional formal training in orthopedics since you entered practice?	14.6%
8.	Referred to a textbook of orthopedics?	86.8%
9.	Operated or assisted in orthopedic surgery?	33.8%
10.	Participated in the pre-operative or post-operative management of orthopedic problems in your patients?	64.2%

What percentage of your practice is what you would classify as orthopedic? (n=302)

0-10	65.9%	10-20	28.5%	20-30	3.3%	30+	1.6%
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How much formal training have you had in orthopedics? (n=264)

None	3.0%
Medical school only, less than one month	26.5%
Medical school only, more than one month	26.1%
Postgraduate, less than one month	9.1%
Postgraduate, one to three months	28.8%
Postgraduate, more than three months	6.4%

Do you think your training in orthopedics was

adequate	49.4%	inadequate	50.6%	for your present practice? (n=255)
appropriate	70.4%	inappropriate	29.6%	for your present practice? (n=162)

How much formal training in orthopedics do you think a family practice resident should have? (n=256)

None	0.8%
Medical school only, less than one month	5.5%
Medical school only, more than one month	15.6%
Postgraduate, less than one month	1.6%
Postgraduate, one to three months	59.4%
Postgraduate, more than three months	17.2%

Identify your practice as to

rural	45.5%	urban	27.7%	suburban	26.9%	(n=253)		
year of graduation from medical school	m=1953 (1928-1957)	(n=262)						
years in present practice	m=18 (1-45)	(n=248)						
number of years of postgraduate training								
1	36.8%	2	39.5%	3	16.6%	more	6.7%	(n=253)
nature of principal postgraduate training (n=258)								
rotating	73.6%	int med	11.2%	ped	0.4%	surg or surg spec	1.6%	
family practice	13.2%							

file of family physicians responding to this survey is significantly different from 94 physicians in the Peterson survey of 1953-1954. At that time 65 percent of North Carolina general practitioners surveyed had only one year of postgraduate training, while the current study indicates that only 37 percent of respondents had one year of postgraduate training and 24 percent have had three or more years of postgraduate training. The distribution of physicians having only one year of postgraduate training in the two studies is significantly different at the one percent level when tested by chi square.

Because only 54 respondents (15 percent) indicated that they have done any postgraduate training in family practice, it is difficult to assess the impact of this training on the orthopedic practice of members of the North Carolina Academy of Family Physicians. Many generalists have been participating in continuing education and have qualified for the examination of the American Board of Family Practice, so there may be a more uniform background in orthopedics than a survey of formal training would indicate.

At present the only information available in the literature on orthopedic education for family practice is

anecdotal accounts of a New Zealand rural practitioner's application of a particular textbook³ and a British general practitioner's program for continuing education in orthopedics.⁴ Epidemiologic data from family practices utilizing problem-oriented records will contribute to our fund of knowledge of office and hospital practice by the family physician, but there will remain the problem of assessing community needs and the problem of assessment of the relevance of postgraduate and continuing education.

The use of mailed survey questionnaires to practicing physicians has been investigated by Gullen and Garrison.⁵ They found that for a survey questionnaire not concerned with a controversial or sensitive subject, sent to all practicing Georgia physicians, the response rate ranged from 34 to 57 percent. Factors significantly and positively correlated to response rate were personalization of address, attractiveness of format, and higher class of postage utilized for mailing. Within given treatment groups in that study, variable response rate could be found for physicians ranked by specialty. In order of decreasing response rates these were: pediatrics, internal medicine, obstetrics, surgery, and general practice. Community size, geographic area of the state, and visit-

ing appointment at a medical school were not found to affect the response rate independently of the format of the questionnaire. Year of birth and year of medical degree were independent variables with response rate decreasing with age and age of degree. Physicians with specialty boards, AMA membership, or membership in specialty societies had a higher overall response rate. The response of physicians to the present survey (a presumably non-controversial, non-sensitive subject) would presumably be subject to many of these factors.

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