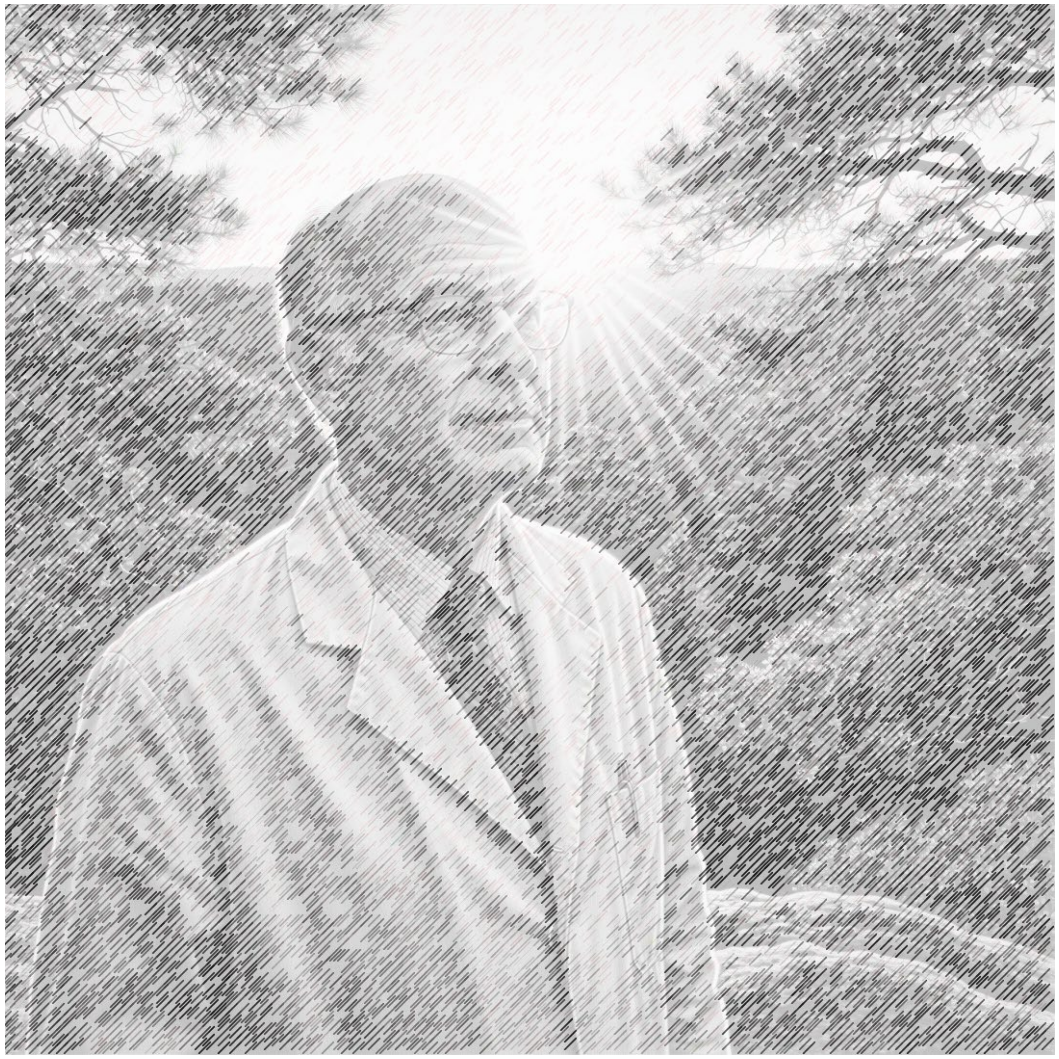
Edward H. Angle Society of Orthodontists
Midwest Component



Research Process Guide

Revised June 2025

ANGLE MIDWEST RESEARCH PROCESS

The Study Committee plays an advisory and support role for affiliate members as they accomplish research requirements for membership to the Angle Midwest Society. In order to efficiently accomplish these research requirements within the established timelines, the Study Committee has developed a research process framework to guide affiliates through progressive steps of envisioning, planning, conducting, writing, and presenting their research findings. Each step in the following framework aligns with requirements for membership, while progressively building the required content for your culminating scientific presentation &/or journal submission. In other words, you build your presentation/paper as you complete each step. A process checklist is also provided at the end of this guide to assist in tracking an affiliate's progress.

Step 1: Exploring and Preparing *(Candidate Year)*

As a Candidate, you will interview with the **Joint Admissions/Study Committees** and discuss your plans to pursue Angle Midwest Society membership. At this meeting, it would be helpful to discuss your past research experiences and 1-3 research ideas/questions that you would like to consider for your project. You will be assigned a Study Committee Liaison during this meeting.

Based on the discussions you have during and following your Candidate Year meeting, you should consider the different types of research involvement available to you. These options could include being a part of a basic science research project or a clinical research project conducted in a University/Hospital setting, conducting a clinical research study in your practice, conducting a survey to answer a clinical or practice management question, or similar option. **If you are an experienced orthodontic researcher, you may be able to combine steps and advance more quickly through the process, with approval from the Study Committee.**

Be sure to speak with potential research advisors and your Study Committee Liaison to discuss potential ideas and the feasibility of completing various studies within the timelines established for Angle membership. It is usually helpful to frame your research ideas in the form of a research question, such as, "What are the effects or relationships of this, that, the other?....or "Is there a difference between this ….and that…..the other?"

As you prepare to explore your research question, the use of a reference manager software is recommended and will prove to be valuable as you develop your Proposal, Research Protocol, and complete the requirements to submit your study for Institutional Review Board (**IRB**) approval (e.g. EndNote and Reference Manager are good tools, but are not free unless you have a University affiliation; Mendeley is free).

Step 2: Constructing a Research Paragraph *(1st Year Affiliate Study Meeting)*

As a 1st Year Affiliate, you will participate in a Roundtable Meeting with the Study Committee *(traditionally held on the first day/Saturday morning of annual meetings)* and discuss a proposed research idea. You will be required to submit to your Liaison a research idea in the form of a **Research Paragraph** (less than 300 words in length) using the simple And, About, Therefore (ABT) format, at least **1 month prior** to the meeting date. This paragraph will provide your liaison with a clear understanding of your idea, so they can assist you better in identifying needed resources and will also help build the structure for the future Introduction/Background/Justification section of your IRB Proposal, Research Protocol, research presentation, &/or potential journal submission.

Research Paragraph Guide *(Introduction; The Gap; The Purpose…The Why)*

Topic/Content	Description of the Content	Specific Writing Instructions
Statement of Interest	Identify the topic you are interested in studying	One sentence
What is known….	High level orientation to the topic	One or two sentences: • Describe some of the recent research that addresses the topic. • Cite 2-3 journal articles that report a perspective on the topic you find interesting
AND	Narrow the scope of your topic	One or two sentences: • Become more specific about what aspects of the broader topic are of interest to you • Cite 1-2 journal articles that align with a specific aspect of the topic that is of interest to you.
BUT	Identify what is missing in the current body of knowledge that you are interested in exploring	One sentence in which you describe a weakness, a gap, or a problem with what is currently known about this topic
THEREFORE	State the research question(s) of interest to you	One sentence: "Therefore, the research question(s) I am interested in studying include: _____"
Methodology	Briefly describe the methods you would like to use to answer the research question(s).	"To address this/these question(s), I would like to use a qualitative/quantitative/mixed methods approach to compare/analyze……"

Step 3: Written Research Proposal *(2nd Year Affiliate Study Meeting)*

You will submit a **written Proposal** to your Study Committee Liaison at least **1 month prior** to the upcoming Affiliate Study Meeting. This will provide the Study Committee with ample time to review the design of your proposed study and provide meaningful input. This proposal should be an **extension of your previous Research Paragraph** (*Background, Focus, Purpose of the Study*) and provide a **more detailed description of the Methodology**, anticipated support and need for additional help, as well as your predicted personal timeline for completion. Click icon to download fillable PDF

Research Proposal Template *(The What)*	
Topic or Title	
Collaborating Team	1. Primary Investigator 2. Associate Investigator 3. Statistician
Resources Needed	1. Data Collection Tools 2. Unique Technological Requirements 3. Human Subject Training Resources
Narrative Proposal	
Refine Research Paragraph from Step 2 (less than 300 words)	
*Expand the description of your Methods from Step 2 and include a **Statistical Power Analysis** to determine recommended Sample Sizes and Predicted Timelines for your study (less than 300 words)*	

Step 4: Coordinating IRB Approval *(Between 2nd and 3rd Year Affiliate Meetings)*

Following your 2nd Affiliate Meeting and approval of your Research Proposal, you should have all the information necessary to obtain IRB approval for your planned research.

NOTE: *In Universities, IRB approval is an essential requirement prior to the initiation of research projects involving humans, regardless of whether the study is retrospective or prospective and is quickly becoming mandatory for publication in professional journals.*

As you organize the information required for an IRB submission, you will essentially be constructing the **Research Protocol** that you will need to submit prior to the next Angle Affiliate Meeting. Additionally, **your Liaison may be able to coordinate approval from the Study Committee ahead of schedule (ad hoc online coordination) once your IRB approval has been achieved and you may be able to initiate your research ahead of schedule**.

Step 5: Approved Research Protocol *(3rd Year Affiliate Meeting)*

You will submit a **Research Protocol** to your Study Committee Liaison at least **1 month prior** to the upcoming Affiliate Study Meeting. This **Research Protocol** is a comprehensive description of your study that includes the information you have acquired and refined during Steps 1-4. Your Protocol should be no longer than 10 double-spaced pages and should include the following:

1. Title
2. Angle Midwest Sponsor, Research Team, & Study Committee Liaison
3. Significance Section:
    a. Concise statement of the purpose, Research Question, and Hypothesis.
    b. Description of the Importance of the study
    c. Novelty of the study
4. Specific Aims/Goals of your project
5. Background and Significance (from Step 2)
6. Study Design and Methods (from Step 2, 3, &4)
7. Summary of your Statistical Methods (model) and Power Analysis
8. Timetable
    a. Data Collection
    b. Data Analysis
    c. Preparation of your Research Paper
    d. Year for Research Presentation
9. References/Bibliography

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Research Protocol Template (*The Why, The What, and The How*) ***Your Name***	
Title	
Collaborating Team	Angle Sponsor, Research Team, Study Committee Liaison

Introduction

Refine Research Paragraph to include the Significance, Novelty, Importance of your study.

Conclude this section with a concise Research Question and Hypothesis

Methods

*Describe your Statistical Methods (model) and include a **Statistical Power Analysis** that support your projected Sample Sizes. Include specific IRB approval information, if available.*

Projected Timeline

Specify the dates and/or start and stop dates for:

1. *Data collection*
2. *Data analysis*
3. *Preparation of your Research Paper*
4. *Anticipated year for your Research Presentation*

Step 6: Progress Report *(4th Year Affiliate Meeting)*

You will submit a **Progress Report** to your Study Committee Liaison at least **1 month prior** to the upcoming Affiliate Study Meeting.

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Research Progress Template *(The When)*	
Topic or Title	
Collaborating Team	1. Primary Investigator 2. Associate Investigator 3. Statistician
Narrative Status	
Describe the current status of your study (less than 300 words)	
Original Timeline *(and any required modifications)*	
1. Data collection: *2. Data analysis:* *3. Preparation of your Research Paper:* *4. Anticipated year for your Research Presentation:*	
Plan for Completion of Study	
Discuss your strategy to complete the study within the established timelines or describe modifications or additional resources that will be required to complete your study (less than 300 words)	

Step 7: Abstract Submission *(Between 4th and 5th Year Affiliate Meeting)*

You will complete an **Abstract Submission** to your Study Committee Liaison **prior to September 1st of the year preceding your 5th year Affiliate Meeting** in preparation for your upcoming Research Presentation. The Angle Secretary will send out a *Request for Abstracts* announcement with a submission form specific to the next year's meeting. Below is an example of the submission form for the Angle Midwest 2024 Session and the current year's version is downloadable at: Abstract Submission Form

ANGLE MIDWEST Annual Component Meeting - February 2-7, 2024

ABSTRACT SUBMISSION FORM

To participate in the upcoming program in Naples, Florida please fill out the form below. After completing the form, save the file, open your email, attach the file, and send to Bridget Miller at program@anglemidwest.org with the subject: **2024 Angle Abstract.**

Member Name:

Title of Presentation:

Type of Presentation: (check all that apply to your presentation)			
☐	Clinical research (40 minutes)	☐	Case report(s) (20 minutes)
☐	Basic science research (40 minutes)	☐	Clinical pearls (20 minutes)
☐	Paper to fulfill admission requirements (40 minutes)		
☐	Review and discussion of a clinical topic (40 minutes)		
Method of presentation: (check all that apply to your presentation)			
☐	PowerPoint		
☐	Keynote		
☐	Other:		
☐	Embedded video in presentation		

Brief Synopsis or Abstract of the Presentation:

Step 8: Research Presentation *(5th Year Affiliate Meeting)*

In preparation for your formal research presentation, the **Program Chair** will assign you a **Discusser**, with whom you will need to coordinate a timeline for their review of your presentation. Typically, Discusser's will want to have your presentation by **January 1st** in order to prepare the discussion of your study at the Annual Meeting in February. However, individual timelines may be necessary based on your Discusser's requirements and schedule.

Although there is not a standardized slide presentation template, you will want to ensure that you structure your presentation to align with the key components of the Discusser Checklist and control the number of slides to allow you to complete your presentation within the 40-minute time limit. The Discusser Checklist can be downloaded from the Forms Page of the Angle Midwest website at: https://www.anglemidwest.org/forms.html and is also reproduced below for your convenience.

CHECKLIST for DISCUSSER

I. THE RESEARCH PROBLEM

1. *Is there a statement of the problem and is it adequate?*

Is the problem clearly, accurately, and completely described?
Are the components of the problem described in enough detail to permit judgment on the appropriateness of the direction taken by the researcher?
Are purposes of the study clearly stated?
A good manuscript will give the discusser a clear and detailed description of the research problem that has been studied. The statement of the problem can be used as a "road map" for reading the remainder of the manuscript and as a basis for judging how well the study accomplished its purposes. If the statement of the problem is missing, severely abbreviated or vague, the remainder of the report should be more carefully scrutinized.

2. *Is the review of the literature adequate?*

Has a thorough review of the literature relating to the problem been made?
Have the studies cited been evaluated in regard to their validity?
Have earlier studies been described in enough detail to show that existing evidence does not solve the problem?
Progress in science requires that each investigator build upon what is already known. The trustworthy manuscript will include a critical, thorough and impartial review of previously related studies to enable the reader to better judge the validity and importance of the study. On the other hand, an author who is trying to convince the reader of the value of some product or point of view is not likely to present a balanced review of related studies. It is usually fairly easy to spot such a report by the absence of any negative findings or contraindications among the references.

3. *Are important terms defined?*

Are important terms and concepts adequately defined?
In the body of the report, are these terms and concepts actually used as defined?
If important terms and concepts are not carefully defined and appropriately used, it may be impossible to be sure what the author really studied. Vague and general terms need defining and the carefully written manuscript will include such definitions.

4. *Are the hypotheses or objectives adequate?*

Are the hypotheses or objectives stated clearly enough to judge whether they can be tested or achieved?
If the hypotheses or objectives are not clear, can they be restated clearly enough to judge whether they can be tested or achieved?
Do the hypotheses or objectives follow directly from the statement of the problem?
Are the assumptions on which the hypotheses or objectives are based clearly stated and obviously warranted?
The hypotheses or objectives are the heart of any research project. If they are fuzzy, poorly stated, or do not follow from the statement of the problem, care should be taken to be certain what was really studied.

II. EXPERIMENTAL OR DESCRIPTIVE METHOD

1. *What is the population and how is it sampled?*

What are the characteristics of the population in which the investigator was interested?
What are the characteristics of the objects or people included in the sample and how large is the sample?
Have any conditions biased selection or assignment of the objects or persons in the sample?
When reviewing research, the clinician should be particularly concerned with the characteristics of the population and sample used in the study.

2. *Research Design* *(for experimental studies only)*

Has the investigator clearly formulated and described his research design?
Has the possibility of hidden factors, other than the experimental variables that might influence the results of the investigation, been considered?
The research design should be meticulously planned and executed to permit firm conclusions. If the research design is not described clearly and in an understandable way, it is a fair bet that the researcher did not formulate the design completely or clearly enough to be valid.

3. *Measurement*

Do the tests and measurements used give reasonable measures of the factors under study?
Is evidence presented to show that the test and instruments used give valid and reliable measures of the factors under study?

Are the conditions in which the measurements were obtained fully and clearly described?
Are all factors or variables listed or implied in the hypotheses or objectives measured?
In all research, measurement is a great importance, but in clinical research, measurement is particularly important. It is often very difficult to develop a reliable and valid measure of many clinical conditions. But often clinical researchers depend on such descriptions as good, fair, poor and bad or clinically pathological and clinically normal or similar category systems when more refined measurements are both necessary and possible. If the measures used are inadequate or if they fail to measure the factors listed in the hypotheses or objectives, caution must be taken in interpreting and using the results of the study.

III. RESULTS OF THE STUDY

1. *Data analysis*

Are all factors that needed to test the hypotheses or achieve the objectives included in the analysis?
Where statistical tests of significance are used, are these tests described, or at least named?
Are the hypotheses, in fact, tested? Are the objectives of the study achieved?
Where the author claims significant differences, are the differences large enough to make any difference in clinical practice?
Depending on the training in statistical methods, the discusser may expect some difficulty in reviewing the data analysis of the study. However, two very important and informative actions can be taken regardless of the background in statistics: 1) Look at the hypotheses or objectives in relation to the data presented to be sure that the author has, in fact, tested the hypotheses or achieved the objectives listed. 2) If statistically significant differences are reported, look at the data to determine if the differences are large enough to be clinically important.

2. *Presentation of findings*

Are the data presented in a straightforward, clear manner suggesting that the author has done a careful job in analysis and presentation?
Are the purposes and contents of the summary statistical tables clear?
The presentation of findings section is a good index of the care taken by the author in his research. It is all too frequent that the presentation of findings is muddled and tables are unclear. If this section is not understandable, conclusions given at the end of the article should not be accepted without very close scrutiny.

IV. DISCUSSION AND CONCLUSIONS

1. *Discussion*

Does the discussion follow directly from the results of the study?
Are generalizations of the results limited to the population and conditions of the study?

When findings and discussion are not closely related, the discusser should be aware of personal or professional biases.

2*. Conclusions*

Are the conclusions warranted by the findings?
Are the conclusions relevant to the situation to which you might wish to apply them?
If the findings of a study are pertinent to a clinical situation, the conclusions should be very carefully scrutinized in terms of the population used, the research methods utilized, and the practical circumstances in which the study was done. Comparison should be made between the data reported in the results section and the conclusions to be sure that they agree.

Research Process Checklist

For those of you who like to track your progress through the Angle Research Process, a checklist is provided for that purpose below.

Affiliate Timeline & Study Committee Requirements for Membership		
Meeting sequence	**Requirements/actions toward membership**	**Completed**
Candidate	**Interview with joint Admissions/Study committees** Promotion to first year affiliate **Assignment of secondary sponsor and Study Committee liaison** Notification by Admissions Chair of promotion and names of secondary sponsor and Study Committee member	
1st year Affiliate	**Roundtable meeting with Study Committee** Discussion of research project(s) you are considering or have interest in the form of a **Research Paragraph** (less than 300 words in length) **Finalize research project with assigned Study Committee liaison**** Promotion to 1st year affiliate	
2st year Affiliate	**Written Proposal for research project due to Study Committee liaison**** Proposal to include Background, Statement of the Problem, Purpose of the Study, Methodology, anticipated need for help (sample gathering, statistical treatment of data, power analysis), personal timeline for completion **Roundtable meeting with Study committee** Promotion to 2nd year affiliate	
3nd year Affiliate	**Written Protocol report to Study Committee liaison**** **Roundtable meeting with Study Committee and IRB Proposal Plan** Promotion to 3rd year affiliate **If you present your paper this year, a structured abstract is due to Program Chair by September 1st, and the final paper is due to your Study Committee liaison by September 1st Acceptance of your presentation and paper fulfills your Study Committee admission requirement	
4rd year Affiliate	**Written progress report to Study Committee liaison**** **Roundtable meeting with Study Committee** Promotion to 4th year affiliate **If you present your paper this year, a structured abstract is due to Program Chair by September 1st, and the final paper is due to your Study Committee member by September 1st Acceptance of your presentation and paper fulfills your Study Committee admission requirement	
5th year Affiliate	**You must present your paper this year**. A structured abstract is due to Program Chair by **September 1st**, and the final paper is due to your Study Committee liaison by **September 1st** **Acceptance of your presentation and paper fulfills your Study Committee admission requirement**	