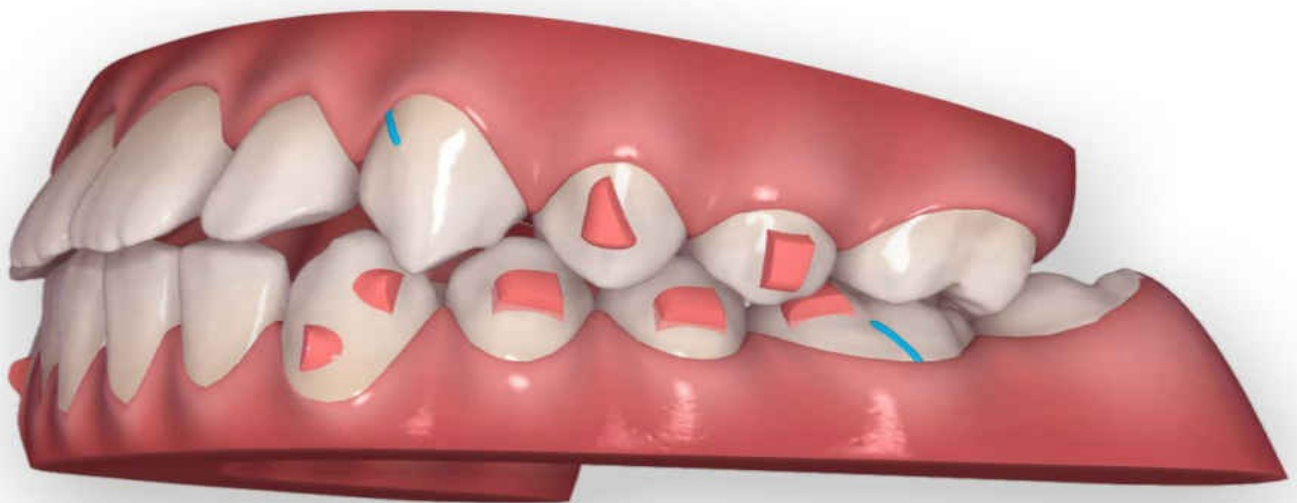


# The Insider's Guide to **Invisalign®** **Treatment**

A step-by-step guide to assist you with  
your ClinCheck® treatment plans



BY BARRY J. GLASER DMD

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[www.AlignerInsider.com](http://www.AlignerInsider.com)

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## Dedication

To Tracy, Scott and Jake,

*La familia es todo*

# BOOK TESTIMONIALS

“Dr. Glaser, like myself, recognized long ago that his students needed to have an organized way to talk to the teeth with plastic force systems just as we do with wire and braces. *The Insider’s Guide to Invisalign Treatment* will set the doctor on the right track to do just that.

This book is well organized to help the doctor learn the important principles in each case type in an easy-to-read, systematic format. Each chapter addresses another aspect of correcting malocclusion with Invisalign clear aligners, and guides the reader through a common-sense approach to virtual treatment planning using the ClinCheck® software. His concept of viewing a ClinCheck treatment plan as force systems, not teeth compliments my own educational principle of think like plastic and feel like a tooth.

*The Insider’s Guide to Invisalign Treatment* is a must-read for all doctors looking to up their Invisalign game. I highly recommend you study this book and keep it next to the computer where you work up your ClinCheck treatment plans. I am confident that if you follow Dr. Glaser’s methods, you will be delighted with the results!”

– Willy Dayan, DDS, Dip. Ortho, Toronto, ON, Canada

“The current landscape of orthodontic literature regarding Invisalign therapy is replete with text books showing before and after cases following a review of some distinct advantages aligners have over fixed appliances in regards to orthodontic tooth movement. The unmet didactic need for the private practitioner is a true ‘how to’ textbook when it comes to treatment planning using the ClinCheck software. Dr. Barry Glaser’s contribution to the orthodontic literature is the first of its kind towards this endeavor and readily services a doctor’s unmet need when treatment planning in the privacy of their offices.

“Whether a novice or more experienced, Dr. Glaser’s logical, methodical, and step-by-step approach is exactly what is needed to streamline the Invisalign

treatment planning process so it will become as second nature as it is for fixed appliances.

This body of work will prove to be a timeless addition to your library to be happily referenced often while submitting your cases. I have removed a text book on fixed appliances to make room for it on my book shelf!”

– Jonathan L. Nicozisis, DMD, MS, Princeton, NJ

“Dr. Glaser has and continues to be a guiding voice in the Invisalign orthodontic community. His commitment to mastering the art and science of moving teeth with plastic is commendable. This book is a testimony to his passion to all things Invisalign. Its content is a wonderful resource for us all. Thank you, Barry, for taking the time and energy to compile your ideas, insight, and experience into this volume. This book is certainly a valuable addition to the wealth of orthodontic knowledge.”

– Bart Iwasiuk, DDS, Burlington, ON, Canada

“If you have been sitting on the fence, thinking about offering Invisalign to your patients, or gaining the confidence to tackle more challenging cases, then this informative and instructive book from Dr. Glaser will get you started on the right path. Dr. Glaser brings his personal and extensive experience as an Elite Provider of Invisalign and provides specific detailed strategies to help you set up your cases with predictable and profitable results.”

– Donna Galante, DMD, Sacramento, CA

“I have had the pleasure of speaking alongside Dr. Barry Glaser, in addition to listening to his lectures and insight on multiple occasions. His knowledge is invaluable, and important for anyone wanting to treat their Invisalign patients with excellent results.”

– Mazyar Moshiri DMD, MS, FICD, Saint Louis, MO

# ACKNOWLEDGMENTS

First, I would not be the person I am today without the brilliant guidance and inspiration of the late Dr. Anthony A. Gianelly. I will be forever grateful to Dr. Gianelly for accepting me into Boston University's orthodontic program back in 1990, an event that changed the arc of my professional life in so many ways. Dr. G, I hope I have made you proud.

To the many Invisalign educators who have inspired me along the way, I would not be where I am today without you. I would be remiss without making special mention of the giants whose shoulders I have stood upon: Willy Dayan, Gary Brigham, Bill Kottemann, Johnathan Nicozisis, Donna Galante, Sandra Tai, Maz Moshiri. Your teachings and friendship are a constant source of inspiration.

Thank you to my amazing staff for not only assisting me in caring for our patients and gathering all the records for this book, but also enduring the countless schedule changes that allow me to go on my teaching expeditions around the world. You guys are the best!

Michelle Gamble, this book would not be possible without your editing and guidance every step of the way. Who knew I could write a book? And thank you to Erin Pace-Molina for all the internal layout as well as the fantastic cover graphics.

Thank you to my patients who appear in this textbook for so graciously allowing me to share their success stories with the world. May your gifts be a source of inspiration for doctors to create healthy, beautiful smiles with clear aligners for millions of patients around the world.

To my parents, thank you for raising me the right way and for always being there for me. You always tell me how proud you are of your son the orthodontist, but this is my opportunity to let you know how proud I am of you! I love you both.

Last but not least, this book is dedicated to my wife Tracy and sons Scott and Jake. There is nothing more important to me in the world than you.



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# Preface

When I set out to write this book, my objective was to develop a user-friendly, systematic guide to virtual treatment planning with Invisalign<sup>®</sup> treatment. Throughout my travels lecturing to doctors about treating patients orthodontically with Invisalign clear aligners, as well as consulting with doctors on my educational website [AlignerInsider.com](http://AlignerInsider.com), a common theme I hear is that many doctors don't "get" Invisalign treatment planning. For example, they don't understand how to interpret what they see on a ClinCheck<sup>®</sup> treatment plan, nor do they understand how to effectively communicate their treatment goals to their technician.

Based on these observations, I developed a 10-step method to Invisalign treatment planning and ClinCheck design I call the "ClinCheck list". The ClinCheck list is a systematic approach to Invisalign treatment planning, providing the doctor with a step-by-step method to guide them through a rational, common sense thought process to achieve consistently excellent results with Invisalign.

Whether you are a first-time user or an experienced provider, the principles revealed in this book will help you look at ClinCheck plans in an entirely new way — as "force systems, not teeth". By retraining your eyes and mind to view your ClinCheck setups as the *forces exerted upon the teeth by the aligners* rather than a depiction of the teeth themselves, you will better understand how to set up your cases to achieve more predictable results, more efficiently, with fewer refinements.

You may be asking yourself, "Why can't I just submit my case, push the "Accept" button on my ClinCheck plan, and have everything track perfectly on every patient?" The short answer is "Because that's not how orthodontics works." Orthodontics, whether performed with fixed appliances or Invisalign, is both art as well as science. The engineers at Align Technology, Inc., the makers

of Invisalign, are continuously innovating their products to achieve more predictable results. SmartForce<sup>®</sup> features, SmartStage<sup>™</sup> technology, and SmartTrack<sup>®</sup> aligner material continue to evolve as the science of Invisalign advances from year to year. Nevertheless, just like with “straightwire” pre-adjusted fixed appliances, despite the presence of a prescription in each bracket for tip, torque and in-out position, we can’t simply “throw in a wire” and have the case treat itself. Wires still need to be bent, auxiliaries used, and adjustments made to accommodate individual variation from one patient to the next. Tooth anatomy, root morphology, bone density and genetic differences between patients means that there will always be the need for an orthodontist treating his or her patient.

*It’s the same with Invisalign.* While advances in aligner technology will continue to improve treatment outcomes, there will always be the need for the orthodontist to monitor, adjust and adapt to the patient’s individual needs. That’s what this book is all about.

It is important to note that the information contained in this book is based on how I approach Invisalign treatment in my own practice. The views and opinions expressed in this book are mine, and are not necessarily those of Align Technology, Inc. Just like with fixed appliances, there are many different philosophies and treatment approaches with Invisalign. In this book you will learn about my unique way of approaching Invisalign treatment. This speaks more to the art of orthodontics — there is more than one way to arrive at an excellent final result. To me, this is one of the joys of orthodontics — each patient presents with new challenges to solve, and the ability to think my way creatively through a case helps keep my practice fresh and exciting. After more than two decades in practice I still enjoy coming to the office every day.

I hope you find the information in this book beneficial to both you and your patients, and I wish you the same excitement and enthusiasm in your practice as I feel for mine.

—Barry J. Glaser, DMD

# A Guide On How To Read This Book

When I began this project, my initial temptation was to simply present patients treated with Invisalign and go through a step-by-step explanation of how I treatment planned the case from beginning to end using the ClinCheck list. I quickly realized that this made for an overwhelming and somewhat disjointed amount of information for the reader to digest. Instead, I decided to break the body of the book into discreet sections, each dealing with a different clinical aspect of orthodontic treatment using Invisalign.

Each chapter of this book deals with a specific section of the ClinCheck list. As a result, you will see many of the same cases presented multiple times throughout the chapters along with an in-depth description of a specific element of ClinCheck treatment planning. For example, the same patient with a CL II div. 1 malocclusion and deep overbite may be presented in both the chapter on sagittal correction as well the chapter on vertical problems. Therefore, you have several ways you can read this book.

If you are relatively new to Invisalign, reading through each chapter in order would make the most sense. In each chapter, another element of ClinCheck treatment planning will be presented along with representative case studies to reinforce the educational concepts.

Here is my recommended approach for new Invisalign users reading this book:

1. Learn the basics in Chapters 1 and 2 then proceed through the remaining chapters in order. Start off with the most common orthodontic problems, *crowding* (chapter 3) and *spacing* (chapter 4).
2. Progress through more complex problems (*vertical, sagittal and transverse*) in chapters 5, 6 and 7.
3. Learn the nuances of *attachments, IPR and staging* in chapters 8 and 9.
4. Discover the importance of *over treatment and over correction* in chapter

10, then finish up with troubleshooting in chapter 11.

Here is my recommended approach for orthodontists more experienced with Invisalign, but may be having a specific challenge. For example correcting deep bites:

1. Start off by reviewing the basics presented in Chapters 1 and 2.
2. Then jump directly to Chapter 5, which deals with correcting problems in the vertical dimension.
3. From there, proceed to Chapter 8 to learn more about how attachments help to achieve deep bite correction, Chapter 10 which explores the concepts of over treatment, then Chapter 11 for some helpful tips on troubleshooting.

Finally, here is my approach for those doctors with extensive experience with Invisalign:

1. Start off with a quick read of chapters 1 and 2 to familiarize yourself with the ClinCheck list, then jump to whatever chapter you see fit.
2. Haven't treated many CL II teens? Off to chapter 6 you go to take a dive into the deep end of the CL II correction pool!
3. Have some troubleshooting questions? Turn to chapter 11. And so on.

In any event, I strongly suggest you keep this book handy at the computer where you work up your ClinCheck treatment plans. You can also download a free copy of the ClinCheck list from my educational website, [AlignerInsider.com](http://AlignerInsider.com). Use the ClinCheck list as a guide on every case, and I am confident that you will quickly see your Invisalign cases track better, require fewer refinements, and finish with consistently excellent results.

—BJG

# INTRODUCTION

## Invisalign Offers a New Way to Grow Your Practice

Invisalign clear aligner technology is growing in the number of patients treated annually. The statistics regarding patient adoption rates worldwide now show according to the *Align Technology Annual Report* that over 4 million patients have used Invisalign technology to straighten their teeth. Orthodontists should wisely consider this growing marketplace as an area to expand their practices to take advantage of the immense opportunities, especially as the market becomes ever more competitive.

Not only does clear-aligner technology, led by the innovative company Align Technology, Inc., enable straightening of teeth in routine Class I cases, but recent advances in techniques and technology now offers correction of more severe malocclusions. Just 10 years ago, the thought of predictably correcting moderate to severe malocclusions with clear aligners would have seemed far-fetched. The latest innovations are creating new market opportunities for orthodontists to not only expand adult teeth straightening, but also teenage cases.

In years past, the adult orthodontic market was limited. Many adults who had severe malocclusions weren't offered much more than traditional metal or ceramic or lingual braces. This prevented many adults who didn't want the stigma of braces from getting their teeth straightened. Today, the evolving technological innovations coming out of Align Technology, which is the leader in clear-aligner products, enables a large segment of the adult population to use highly esthetic clear aligners to straighten their teeth. The clear aligners enable adults to avoid the perceived embarrassment of braces and easily persuade them to straighten their teeth even as senior citizens.

Invisalign also offers orthodontists the opportunity to increase their teen product offerings. Not only can clear aligners now correct most malocclusions,

but also Align Technology addressed parental concerns about lost aligners and teenagers not being responsible enough with their aligners. Without these new programs, orthodontists were finding it challenging to grow the use of Invisalign among the teenage market segment. In doing patient evaluations and providing recommendations, orthodontists were coming up against parental concerns about extra costs due to teenagers losing aligners or not properly wearing their aligners. Parents were attracted to fixed braces vs. clear-aligners because of these concerns. As a result, clear-aligners weren't as broadly adopted by teens.

So Align Technology implemented its Invisalign Teen program to responsibly address parental concerns. Now orthodontists have in their arsenals a great marketing tool to encourage parents to use clear-aligners instead of fixed braces for their teenagers. The program features and benefits make the orthodontist's sales job easy.

Invisalign Teen addresses issues such as misplaced or lost aligners by offering free aligner replacements (up to a certain number). Additionally, Invisalign Teen uses compliance indicators — color-changing markers to indicate for parents whether or not their teen is properly wearing their aligners. These offers have alleviated parents' concerns, and as a result the Invisalign Teen program is rapidly growing in adoption rates.

Your orthodontic practices can greatly benefit from expansion into the Invisalign marketplace. Opening the door for more opportunities to serve the adult and teen market make it a terrific way to grow your practice.

**To do this, you will need education about the latest Invisalign treatment techniques.** This knowledge will help you understand Invisalign's potential value through the technology's capabilities. It may even inspire you to broaden your orthodontic patient solutions using my prescribed principles, practices and methodologies to achieving winning results.

As the author of this book, my intention is to help orthodontists see Invisalign not just as a device to correct malocclusion, but to understand the science behind the technology. For those of you unfamiliar with Invisalign technology,

*ClinCheck* is the software application created by Align Technology designed specifically for doctors who register to work with the program. ClinCheck provides a 3D virtual representation of a treatment plan derived from the doctor's orthodontic prescription. Each doctor is able to send information back and forth with Align as changes are made to the treatment plan, and then aligners are manufactured to the plan and sent to the doctor for the patient's treatment.

In this book, I will be showing you how to use the ClinCheck software to become a sort of "orthodontic software engineer". I will help you understand how to use the software tool to integrate the digital capabilities with the physical practice of moving and adjusting teeth. I will also uncover the scientific principles and techniques behind the technology that enable practical patient application.

As we step through this process of using ClinCheck software, you will see how modern orthodontic techniques are applying the science of innovation and technological evolution to inspire new ideas in orthodontic practice. This book outlines those principles and science behind clear-aligner treatment to motivate new ways of practical application to achieve beautiful smiles and healthy occlusions even in some of the most challenging cases.

As I begin this introduction into the new innovations and practical applications of Invisalign technology, I will identify specific opportunities to apply ClinCheck software to engineer the teeth into place. Yes, I said engineer. You will use ClinCheck to become a new breed of orthodontic software engineer to figure out how to move teeth using my principles described in the upcoming chapters. I am going to outline and explain how I use ClinCheck software to essentially "over-engineer" the teeth (I'll explain what I mean by "over-engineer" in the following chapters) to correct almost all problems.

As an orthodontist myself I understand the unique challenges we all face to remain competitive in this changing industry. I've learned a lot about Invisalign technology, and I'm going to share my insights and hands-on experience to help you understand and apply my principles and knowledge to your own patients. Maybe using my techniques, you will even recognize new ways to apply them



yourself. When you learn my tried-and-true techniques how to “over-engineer” and manipulate the teeth using ClinCheck you will ultimately benefit both your patients and practice. So let’s get started.

— Dr. Barry Glaser

# CHAPTER 1

## Principles of Invisalign® Treatment Planning

Before I became a Certified Invisalign Provider in 2006, I saw clear-aligner technology as just another in a long line of frustrating, underperforming removable appliances. In my pre-Invisalign days, adult patients would frequently present for consultation with lower incisor crowding asking for “just a retainer.” Psychologically, adult patients would often underestimate the magnitude of their orthodontic problem, from both a clinical as well as financial perspective. In their minds, “just a retainer” would be an inexpensive, easy way to straighten their teeth. In my earliest days of practice, I would welcome these patients, only to find that these “simple” six-month lower incisor alignment cases weren’t progressing well and were falling way past the estimated completion date. Ensuing discussions with these patients revealed that despite clear instructions, the retainers were not being worn full-time as directed. “I can’t wear this thing to work!” was heard in my office more times than I care to admit. The patients weren’t compliant, the devices weren’t producing straight teeth, and of course it was all my fault. No matter what I tried (spring aligners and other removable appliances) I simply couldn’t get teeth straightened on a consistent basis without using traditional braces. As a result of these frustrating experiences, I quickly gave up on removable appliances as an option to straighten teeth. Needless to say, I was losing this adult cohort of patients to treatment year after year and was missing the opportunity to capitalize on the growing adult segment of the orthodontic population.

In 1999, Invisalign arrived on the scene. My initial impression was that clear aligner therapy was going to be another in a long line of failed removable appliances. I was skeptical of the ability of clear aligners to achieve the control I had with fixed appliances, and I was bruised and battered from the practice management nightmares I had with my previous “just-a-retainer” patients.

I became Invisalign certified in 2006 as a self-proclaimed skeptic. Initially, I viewed clear-aligner therapy as a minor tooth moving appliance at best, and I was quite skeptical of both its efficacy as well as patient compliance. I began treating adult mild crowding and spacing cases — those that I recognized as removable appliance cases. Surprisingly, I found my earliest test cases to turn out quite nicely. In addition, patients (only adults at this point) seemed to wear the aligners the required 22 hours per day with little complaint, and in fact, high levels of satisfaction. Before long, patients began to seek me out for Invisalign treatment.

As time went on I started to see gradual changes in the clear-aligner technology, ideas behind it, techniques to apply it, and practical application of it. As an orthodontist I slowly tried out these practices on patients; however, it wasn't until 2010 that I became more educated on the emerging applications of this technology. It was then that I attended the Invisalign Summit for the first time and learned about the revolutionary Invisalign G3 technology.

At the Summit I started to realize the innovators at Align Technology were working out actual scientific methods on how to get the aligners to work more predictably. It was also interesting to discover that they were now talking about the techniques in terms of science — a word I had never heard applied to clear-aligner therapy before. At that moment I resolved to learn all I could about treating malocclusions with Invisalign, and resolved to fully integrate Invisalign into my practice.

One of my earliest success stories came with using Invisalign on a patient with a Class I malocclusion, complicated by severe upper and lower crowding. Quite frankly, I didn't think I could complete the case with aligners alone, and I counselled the patient that I would have to finish his case in braces. In this case (image 1-1, 1-2), I was able to use Invisalign to correct the problem without extractions in 25 months of treatment. This case was one of my earliest successes, and I still view this patient as an “index case” — meaning if I could successfully control his severe crowding with Invisalign, there were a multitude of mild to moderate cases I should be able to control as well. It was