



## Post & Core Build up “Support for a Final Success”

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### Abstract

The purpose of the article below is to provide guidelines and useful information for a dental practice aimed at predictive results and with concepts for the benefit of the patients and not fully for the economic benefit of the treating center or dentist.

All the following information was conceptualized basis in the conventional clinical background after many years of practice, but this cannot be taken as complete guideline to provide procedures, or to generate market concepts of specific materials, instead should be used to improve and apply the information to understand our own practice.

**Keywords:** Post & Core; Dentistry

Dentistry can be define as a: “The evaluation, diagnose and process to create, repair, restore and maintain, the oral health” [1], for this main purpose all the protocols and decisions to perform a dental treatment must to be aimed in order to get final results in predictive way and with the most stable condition possible in long term.

Having clear those parameters, the multiple dental brands in the market design many materials and systems, to provide to the professionals a wide range of options to perform the best possible treatments on each case of each patient. However, currently the constant search of economic benefits, the excessive treatments and the uncontrollable seek of success are guiding multiple dental centers and dental professionals in a wrong path, so some of the protocols that should be included in the treatments are just skipped out to make the process cheap for the center, however as well will be translate into equally “cheap” results for the expectations of our patients.

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### Definition

Can be define as: “Intra radicular portion of the tooth restoration that was under endodontic treatment and will support and provide retention to the final restoration” [2].

The post and core system, will have a crown portion and a root portion, the crown portion is the one that after proper build up, will be prepared anatomically like the natural tooth and the root portion in the dental restoration that will provide retention and support for the core material [2].

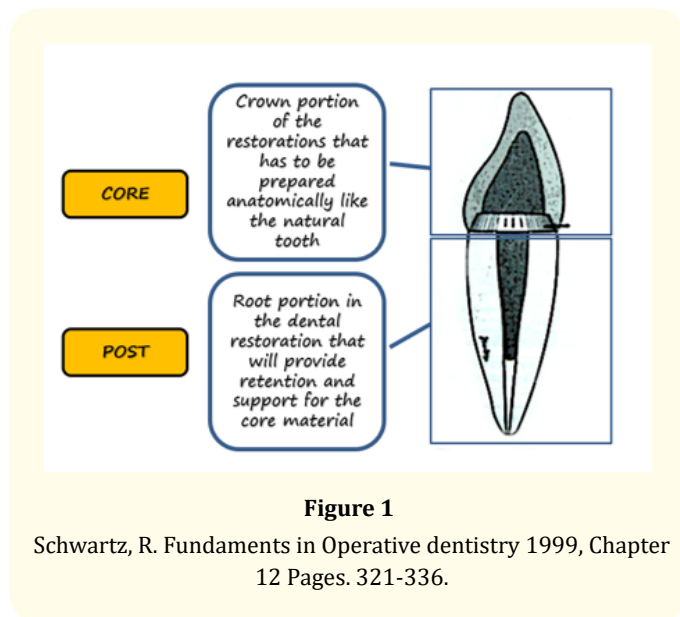


Figure 1

Schwartz, R. Fundamentals in Operative dentistry 1999, Chapter 12 Pages. 321-336.

Regarding the post and internal root retention, in the past it was believed that post reinforce the dental root, however the studies has been DE estimated this clinical behavior, in fact the post is a procedure done in order to provide more stability and retention to the final core as well to the final crown. For the procedure is important have clear parameters like the position of the tooth in the arch, occlusion, restored tooth function and canal configuration and shape to choose the properly material or post system for each case in order to provide the best possible stability in long term. However it is decisive to understand the condition of the tooth to be treated because after the RCT or the multiple previous treatments, the tooth is a tissue with a possible weak remaining dental tissue, with a questionable solidity of structure and with a collagen denaturation as a result of the loss of the dental wettability [2].

### Considerations in the post design

After a proper evaluation of the area to be treated there is certain parameters or considerations to evaluate, to select the correct post for each case. The parameters and considerations will be listed below [1].

- **Post Design:** Will depends to the retention that the post has to offer, definitely will be subject to the remaining dental tissue, cases with less than 60% of remaining dental tissue should be performed with cast post ideally over 60% a fiber post will be an stable solution, however as was explained from beginning must of the cases will be

according a clinical inspection and proper predictive evaluation.

- **Post Length:** The greater length, greater retention, always without passing the limitations of the case, ideally the length should be between 7,0 to 8,0 mm with a minimal apical seal of 4 mm, however length not means width, the increase on the width will be a possible increase on tension and potential “wedge effect” that will result in a potential fracture.
- **Post Diameter:** As was include above, increase the diameter will not increase the retention. Otherwise, it will trigger a possible increase in the gap resulting from endodontic treatment, increasing the possibility of a vertical fracture due to an increase in the wedge effect.
- **Pressure Release:** In case of a cast post design, ideally a cast post pattern should be designed with a portion to let it release the cement, reducing the internal tension as result of pressure, that in case it will not be followed accordingly, will result in rebounding of the cast post and remaining gaps after final cementation, increasing in a long term the questionable durability of the procedure due to the clear and normal hydrolysis of cements in the oral environment.
- **Rough Surfaces:** To mayor roughness better retention, some of the available post systems has surfaces with retention previous designed by the manufacture. As well the use of solutions to clean or increase the roughness, reducing the surface tension and increasing the wettability of the post surface for sure will develop a better retention of the post inside the tooth. However, the brands sometimes not suggest to make any surface treatment on fiber post, due to the clear reactive surface of the Fiber Glass to adhesives and composite cements, but for cases with cast post the sandblasting definitely not just will keep the active surface of the post clean as well will provided a roughness that will increase retention.
- **Root canal treatment (RCT):** Currently, endodontic treatments are aimed at providing the endodontic treatment while maintaining the internal dental structure to the maximum, avoiding generating unnecessary gaps or retentions that over time can result in excessive weakening and potential fracture of the dental remnant. Endodontics is currently aimed at conservative and minimally invasive treatment.

### Classification

The post systems or post options will be classified according, the material, the form, the surface and the type of manufacture. Having clear the classification will be more easy to choose the ideal or proper for each case, however the choosing option will be as well conditioned to the clinical background of each professional, the

available materials on the center and the perspective of result that each dentist has for the case. The idea is not to limiting the dental practice instead provide the paths for a better choosing or ideal maybe in cases with not clear or questionable prognosis.

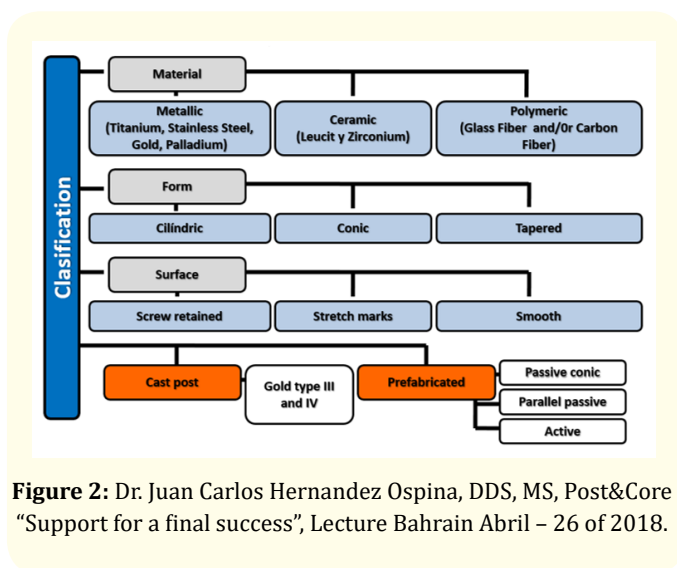


Figure 2: Dr. Juan Carlos Hernandez Ospina, DDS, MS, Post&Core “Support for a final success”, Lecture Bahrain Abril – 26 of 2018.

However is relevant have clear the proper selection for each case following the parameters explained in this document before, the worst case scenario for a post & core treatment will be the potential fracture of the remaining dental tissue, so the selection criteria paying attention to the remaining dental tissue to be restore definitely will reduce the percentage of fatigue and the non-expected fracture.

Giovani, AR., *et al.* and Sirimai, S at col, evaluate the percentage of fracture for metallic cast post and fiber post and the location of those fractures related directly with the restorability and prognosis of each case [3-5]. They recorded their results as follows:

FRACTURE PERCENTAGE				
Type of Fracture		APICAL	MEDIAL	CERVICAL
Giovani et al. 2009	CAST POST	70-90	10-30	0
	FIBER POST	0	40	60-70
Sirimai et al. 1999	CAST POST	10	90	0
	FIBER POST	0	20	80

Figure 3

The percentage of fractures for metallic posts with apical compromise was between 70 to 90% instead the fiber post shows fractures at cervical level (with high potential restorability), between 30 to 70% of the cases. This means the fractures due to cast post shows a worst prognosis and the restorability was practically null, however this does not pretend to reject the use of cast post because the selection will depend according the limitations or indications on each case.

### Metallic cast post

Used in cases that will overpass a destruction of 60% of the remaining dental tissue.

#### Advantages

- Better malleability in function once is done with Gold type IV.
- High Resistance under extreme forces.
- Once made in Gold type IV low modulus of elasticity.
- Soft core surface after preparation.
- Complete adaptation in the design to the dental canal.
- Ideal for cases with dental loose over 60%

#### Disadvantages

- Long and wasteful design process.
- Non esthetic result for ceramic crowns or translucent restorations.
- Never done with Gold type IV, normally performed with conventional alloys.
- In case of fracture worst restorative prognosis.
- Limitations on cementation and retention.
- Active retention > Internal Tension
- Fractures over 70% of cases on the apical third.

### Screw retained post

This is an old-style technique, currently forbidden in adhesive dentistry or even in new dental procedures, is a treatment that has the higher percentage of failure and irreversible damage to the treated tissue.

#### Advantages

- Low price.
- Easy procedure to be done.

#### Disadvantages

- Mismatch color due to particles released from the metal.
- Increasing the tension due the screw system.

- Less compatibility with composite resin materials.
- Contraindicated for proper esthetic restorations.
- High potential rate of fracture and failure with hopeless restorability.
- Fractures normally providing vertical compromise due wedge effect.

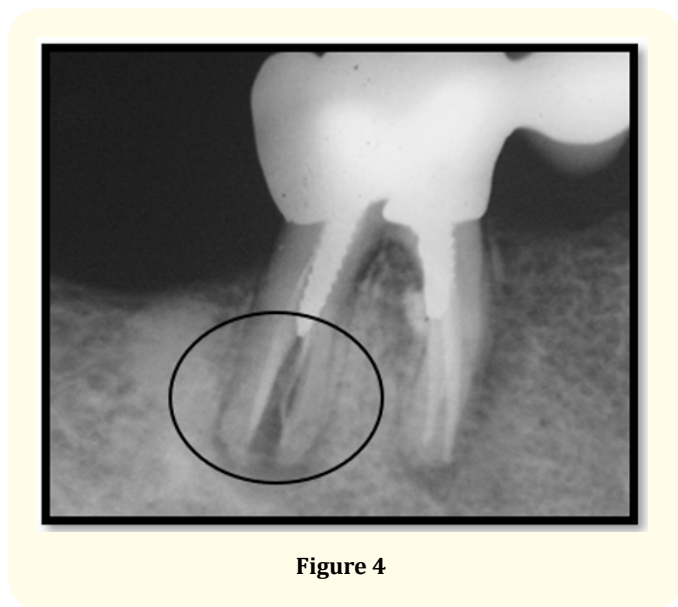


Figure 4

### Glass fiber post

Latest option in post & core techniques, available in many of dental brands on the market, provide a more predictive result with a protocol to follow with few simple steps. In terms of failure has a lowest rate and when it come to be a part of fracture normally has big rate of restorability if its compare with cast post or screw retained systems [6].

### Advantages

- Esthetic Results.
- Easy to standardize the technique.
- Easy dental procedure under proper protocols.
- High compatibility with composite resin restorations and adhesive procedures like complete etching or self-etch.
- Complete passive insertion due to tapered shape.
- Less or almost none stress over dental tissue.
- No mismatch color with ceramic restorations.
- Fractures normally on cervical areas with high chances of restorability over 70% of cases.

### Disadvantages

- Relative higher price if compare with the previous ones.
- Specific system for each brand

### Core build up

Together the post and core procedure imply as was explain before a portion of the restoration in the root and the another on the crown. The core build up will be the portion that allow to us to perform the anatomical part of the remaining dental tissue in order to receive and support the final restoration. The core is the material that will be designed and attached to the post in order to provide stability, retention and abutment shape for a final crown or as a final restoration.

Will give the possibility to restore teeth with questionable prognosis in order to support a final ceramic restoration or even as a support of a final composite. The idea of the post & core as system should not be only consider as solution of crowns, as well could be used for conventional restorations with teeth that not has the proper stability due limitations of the clinical case or by external conditions (ex: lack of patient’s time, economic issues, limitation on the clinical protocol etc.).

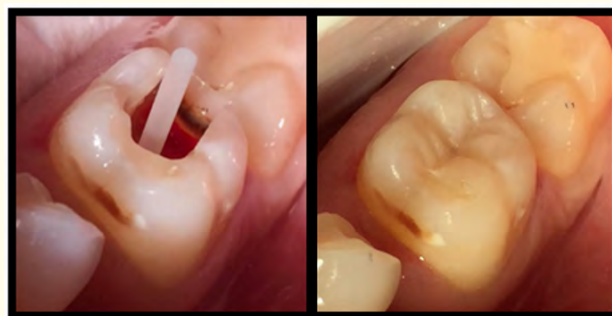
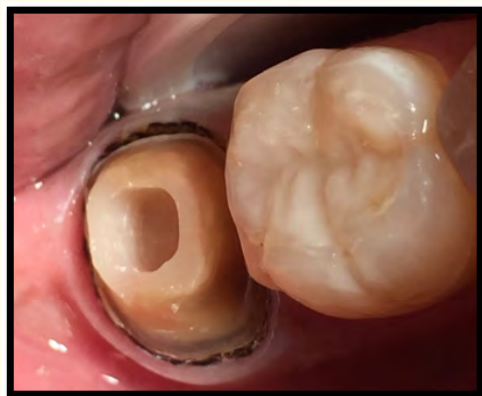


Figure 5: Post&core case done at 36 and finally restored as conventional composite resin restoration under incremental technique.

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Also, the core build up could be consider as a restoration without the use of post in cases were the limitation to prepare the tooth or with questionable clearance to provide an ideal abutment’s height. So, the possibility of a core build up as endo-build up (for

conventional endo-crowns) becomes to be a suitable option for some selected cases with a strict selection criteria.



**Figure 6:** Core build up (Endo-build up) done at 47 for ceramic E-max Crown with several failures of old crowns due to lack of clearance.

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### Post & Core procedure protocol

The steps and protocols to perform a properly post & core is almost an standard in the main and/or available brands in the market, as longer the procedure will be done according the instructions of the manufacture, for sure the result will be according the expectations and predictive as ideally should be planned from the beginning of the procedure. The following steps were included in the current document having clear a clinical background and the evaluation of some of the post systems available in the market, the process could be adapted for each case according the needs of each case [6,7]

1. Deobturation of the canal ideally should be done by Endodontist
2. The deobturation should end with at least 4 to 5 mm of apical seal, however, depends on canal limitation.
3. The deobturation should be done under no pressure, low speed ONLY 1,000 – 2,000 rpm and water irrigation.
4. The deobturation must be done without force since the bur will go through the area of less tension.
5. The post must to be proved and fit in on the canal already prepared.
6. Before cementation the post must to be cut according with the length needed.

7. Cleaning with alcohol will reduce the amount of contamination on the surface of the post.
8. Cleaning with Sodium Hypochlorite 2,5–5,25 % and rinse with water immediately after.
9. Use paper points until you will find the paper points perfectly dry.
10. Cementation should be done ideally with Self-etch and Self-adhesive materials with extension tips.
11. Final cementation of the post + light cure of 40 seconds and/or 5 minutes of dual cure, excess can be removed with MICROBRUSHES or even used as a part of the final restoration.
12. After all these steps the final restoration or core can be performed according adhesive protocols.

### KISS and RTR policy

With the advent of new technologies and with the constant interest of provide good dental treatments. Is Dentist’s professional duty to perform every case according the limitations, conditions and possibilities which will be faced, not forgetting the needs and expectations of our patients and providing the best possible of dental field.

As was explained before the idea of current document is provide a feedback and some information in order to improve and help the dental practice, so the KISS and RTR policy becomes to be the resume of many days of dental practice looking for a practice framed in responsibility, ethics, practicality, respect and time. These policies are acronyms as a result of a personal dental practice directed to a two-way procedure were “easy to easy” (from doctor to patient) becomes to be the centre of our main concern [8].



**Figure 7:** Dr. Juan Carlos Hernández, own dental protocol basis on 3M recommendations.



KISS12, becomes to be acronym of Keep It Simple, be Smart, as longer our practice will be done in order to reduce the exposition time of patient's to the dental chair, were the number of appointments could be reduced as must we can and the number of temporary procedures will be minimal and been replaced by transitional procedures or final ones, when the diagnosis and prognosis allow us to proceed, we will start to do a dental treatment basis in the awareness of the patient as human being and not as a vehicle of business success or sadly as source of money.

The idea of KISS is creating a philosophy of mutual respectful interaction were the health benefit of the patient becomes to be our focus point, and provide a better experience that will not be just limited to the technology available as well will be framed in the experience as human being, where the patient will appreciate the respect of their time, needs and expectations, getting a proper result but in a simple way to do it, without pushing patients (or clients as are called in marketing), to more uncomfortable procedures (dentistry itself is dis comfortable for most of the patients), and having the idea of a two-way benefit (easy to easy) where the professional also will be benefited of better working time, less hours exposed to long procedures and at the end, optimization of resources, time and quality, that truly and been lucky for sure will produce an effect of more happy patients and more referrals.

However the RTR policy 12, it's not have been apart from the previous concept, in fact it could be intimately linked with the idea of benefit to our patients, but as well to get a respectful internal environment were the whole staff involve in the procedure will be counted as essential part of the treatment's success. The RTR acronym means: Restore To Respect, this is the result of understand that each step on any dental treatment counts as a definitive step to reach the success but as well imply that the step that will be perform will provide respect to our previous colleague and provide strong basis for the next treating doctor if apply. However, the RTR becomes to be a philosophical way to understand the respect to the patient, to the dentist (colleagues), remaining staff involve in the clinical process and the centre. This with the idea of avoiding potential failures and the annoying and unnecessary “redo cases” that will reduce the resources for the centre, will take time from patients and doctors and will imply submit the patients two (or more) times for the same procedure.

RTR was designed with the idea of reducing the redo tendency, where respecting the steps will imply show our interest in a good

final procedure and the respect of the whole protocol in which the patients has been involved, including the internal environment of the centre that was surrounding their treatment.

## Conclusions

1. A tooth with RCT, is not weak, instead is a not enough stable tooth and proper restorations will provide an ideal possible stability to avoid potential fractures.
2. The use of amalgams or even conventional glass ionomer are not indicated and are forbidden for core build ups, the amalgam itself increase the wedge effect leading the tooth to a potential vertical fracture
3. A tooth with RCT is not always indicated for crown as a final restoration, but a tooth with RCT is indicated always for a post to stabilize the clinical condition.
4. The use of cast post shows high resistance to the loading if compares with glass fiber posts and core build up, however the use of Glass Fiber post with a minimal remaining dental tissue shows good behavior and predictivity.
5. The fractures on teeth with post systems shows multiple kind of fractures on the researches, however the cast post and screw retained posts + retention pins show the worst results with vertical fractures and poor or null restorability.
6. The fiber post shows the best results regarding the viability to restore after fracture, with most of the fractures on cervical areas
7. The modulus of elasticity of Fiber Glass posts is similar and close to that of dentin which allows to uniformly decompose the loads and reduce the fracture potential.
8. The use of screw retained posts, dentinal pins and even cast posts increase the potential of vertical fracture on the tooth and fractures with poor or null restorability
9. The fiber post system has high compatibility with esthetic procedures as composites and ceramics, as well has a friendly protocol to reduce working time and increase the potential of success
10. The use of posts NEVER will provide strength to the endodontic treated tooth, will offer just support and stability for the final restorative material providing stability to the whole tooth and the potential crown or core.

11. The resistance and/or strength to the fracture will not be affected due to the use of post or either not, however the stability of a tooth after RCT will be affected or conditioned to the remaining dental tissue.
  12. The final restoration as a core build up or composite should be done with materials compatible with adhesive techniques
  13. The core build up should be done with CORE BUILD UP COMPOSITE due to the compatibility with post
  14. The cementation of posts should be done with self-etch and self-adhesive materials to avoid a denaturalization of the collagen on the root, as well to increase the standards, the auto mix system will improve the result
  15. KISS should allow to have predictivity and low range of failure and RTR allows to have better results and low possibilities of redo. And bot together will lead the practice basis in respect, responsibility, ethics and two-way easy to easy benefit perspective.
7. Clinical Photos and background belongs and are authority of Dr. Juan Carlos Hernandez Ospina.
  8. KISS and RTR policies authority: Hernandez Ospina, Juan Carlos: Included as first time in lecture Post & Core Build up “Support for a final success”.

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## Bibliography

1. Hernández Ospina Juan Carlos. Post & Core Build up Support for a final success.
2. Schwartz R. Fundaments in Operative dentistry (1999): 321-336.
3. Giovani AR., *et al.* “In vitro fracture resistance of glass fiber and cast metal posts with different lengths”. *Journal of Prosthetic Dentistry* 101 (2009): 183-188.
4. Sirimai S., *et al.* “An in vitro study of the fracture resistance and the incidence of vertical root fracture of pulp less teeth restored with six pos and core systems”. *Journal of Prosthetic Dentistry* 81 (1999): 262-269.
5. Hernandez Ospina Juan Carlos, DDS,MS ; Resistance of the internal retention of posts: A systematic review El Bosque University (2009).
6. Courtesy–3M Catalogs [www.Multimedia.3M.com](http://www.Multimedia.3M.com)