



Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

Research and Report Writing
(RRW)

International
Academic Centre

Academic Writing in Journal Papers

1. How to read a scientific paper
2. How to write academic sentence
3. How to write academic introduction
4. How to write academic main body
5. How to write academic conclusion
6. How to write a paper

Paper - Structure

- A title.
- Abstract.
- Keywords.
- An introduction.
- Method.
- Results.
- Discussion.
- Limitations.
- Conclusions.
- References/Bibliography.
- Appendices.



How to read a paper



1. Read the abstract
2. Read the last paragraph in the introduction
3. You may need to read the second last paragraph
4. Read the last two sentence of each result
5. Read the last two sentence of each discussion paragraph
6. Read the paragraph before conclusion
7. Read conclusion



Available online at www.sciencedirect.com

ScienceDirect

Procedia Structural Integrity 15 (2019) 2–7

Structural Integrity
Procedia
www.elsevier.com/locate/procedia

International Conference on Stents: Materials, Mechanics and Manufacturing ICS3M 2019

Distinguish the Stable and Unstable Plaques Based on Arterial Waveform Analysis

M. Abdulsalam, J. Feng*

Department of Engineering, Faculty of Science and Engineering, Manchester Metropolitan University, Manchester, M1 5GD, UK

Abstract

The rupturing of unstable plaques, formed by atherosclerosis, is the main factor contributing to the stroke event. According to stroke association in 2017, the stroke is the fourth leading cause of death in the UK. The percentage of plaque composition plays an important role for plaque stability and can be considered as important information to determine whether the patients need surgery or not. The main aim of this work is to determine the relationship that exists between plaque composition and arterial waveform for distinguishing stable and vulnerable plaques. An *in-vitro* experiment, representing the arterial system, is used to investigate the effect of the composition of the atherosclerosis on the propagation of the arterial waveforms. Different types of the artificial plaque, fabricated manually, were implemented into the artificial carotid artery. The pressure, velocity and arterial vessel wall movement were measured simultaneously proximal to the site of the arterial plaques. Wave intensity analysis (WIA) was used to separate the waves into forward and backward waves to identify how the plaque compositions will affect the reflected arterial waveforms. Our results indicated that stable plaques caused the stronger reflected waves, leading to the higher amplitude of the arterial diameter waveform. In general, this study demonstrated that the arterial waveforms are strongly associated with the compositions of the arterial plaques, implying the arterial waveform could provide the information to characterize the types of the plaques, then leading to a novel approach to stratify the atherosclerosis patients and determine if the interventional vascular surgery is needed.

© 2019 The Authors. Published by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Selection and peer-review under responsibility of International Conference on Stents: Materials, Mechanics and Manufacturing ICS3M 2019.

Keywords: Stable plaque; Vulnerable plaque; Wave Intensity Analysis;

*Corresponding author. Tel: +441612471650

Email address: J.feng@mmu.ac.uk

1. Introduction

Cardiovascular diseases (CVD) cause a death for almost 30% in the worldwide and could even lead to disability (Kohn et al., 2018). Stroke is the fourth largest causes of death in England and Wales, and the third in Scotland where approximately 100,000 stroke events occur in the United Kingdom (Stroke Association, 2018). The atherosclerosis plaque in the carotid arteries is considered the main cause of a stroke and it is

1. Introduction

Cardiovascular diseases (CVD) cause a death for almost 30% in the worldwide and could even lead to disability (Kohno et al., 2018). Stroke is the fourth largest causes of death in England and Wales, and the third in Scotland where approximately 100,000 stroke events occur in the United Kingdom (Stroke Association, 2018). The atherosclerosis plaque in the carotid arteries is considered the main cause of a stroke and it is

2452-3216 © 2019 The Authors. Published by Elsevier B.V.
This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)
Selection and peer-review under responsibility of International Conference on Stents: Materials, Mechanics and Manufacturing ICS3M 2019.
10.1016/j.prostr.2019.07.002

M. Abdulsalam et al. / Procedia Structural Integrity 15 (2019) 2–7

3

initiated by inflammatory processes in the endothelial cells of the artery, which is associated with retained low-density lipoprotein (LDL) particles. The LDL, therefore, will pass through the endothelium, which build up the so called 'Plaque' (Johri et al., 2017).

There are several types of plaques, and some of them are more likely to rupture than the others. The stable plaques are less likely to rupture because they have a thick fibrous cap with a small lipid core (LC) area (van der Wal, 1999). While unstable and vulnerable plaques have been characterized by several studies which indicate that they have a thin fibrous cap (< 65 µm) and its LC is substantial (Libby, 2001; Andrews et al., 2018). If plaque ruptures in the carotid artery, it will either block the oxygenated blood from reaching the brain or bleed, which will lead the brain cells to die (Li et al., 2019).

In recent years, Magnetic Resonance Imaging (MRI) has played an important role in assessing the health of blood vessels. One of the MRI studies investigated the macrophages by using Polymeric Nanoparticle PET/MR Imaging to detect atherosclerotic plaques. That study proved that this technique can be used as a non-invasive method to assess the inflammation plaques and can play an important role in the therapy purposes (Majmudar et al., 2013). However, one of the limitations of this technique is that the acquisition data is not simultaneous, which may lead to creating incorrect results (Cuadrado et al., 2016). In addition, the negative sides of MRI are relatively high cost and require breath holds, which may not be suitable with some patients. The composition of plaque and its vulnerability were examined by Naim et al. (2013) to evaluate the ability of non-invasive vascular electrophysiology (NIVE) by applying high MRI resolution. Although this study success to detect the present of lipid core in the significant stenosis, it fails to detect precisely the vulnerability of plaque.

Jashari et al. (2015) used Cone Beam Computed Tomography (CBCT) in conjunction with ultrasound to detect the atherosclerotic calcification in the carotid artery. It is true that this study identifies the volume and the presence of calcification, but does not show the detection of LC and the progress of plaque in the early stages. Sigovan et al. (2017) applied 3D black blood Magnetic Resonance Angiographic (MRA) of the carotid blood vessel to investigate intra - plaque hemorrhage (IPH) and the stenosis, which showed reliable measurements in the stenosis of the carotid vessel, although overestimation has been detected through comparison with 3D contrast-enhanced angiography. The pulse wave imaging has been used in recent study with stenosis degree between 50% and 80% in order to identify the plaque properties (Li et al., 2019). This study gives an optimistic view that it is possible to differentiate between plaques. However, the results of this study, to large extent, are not accurate because the data was not adequate due to complex waveform. To date, a novel technique, being able to distinguish the compositions of the plaques and providing the accurate information to the vascular surgeons to clarify the types of the plaques, is still lacking. Therefore, the main aim of this paper is to use the wave intensity analysis (WIA) techniques to separate the arterial waveform into the forward and backward components to characterize the difference between stable and unstable plaques.

2. Theoretical background

tion

were firstly collected with no plaque as a healthy case and the measurements were taken proximal to the plaques. The flow rate and wall movement data were collected simultaneously and sent it to the computer. These data were analyzed by Matlab version 16.

4. Results

4.1. The measured diameter and velocity

The measured velocity and diameter for the healthy one (no plaque), unstable plaque and stable plaque are shown in Fig.2 a and b, respectively. It is clear that the higher amplitudes of diameter waveforms were generated in the arteries with the plaques attached, while healthy artery with no plaque has the lowest amplitude of the diameter waveforms. As is expected, the stable plaque generated the highest amplitude of the arterial waveform, while the amplitude of the diameter waveform in the artery with the unstable plaque is less than that with the stable plaque. Similar pattern was also found for the velocity arterial waveform although the difference between three types of arterial system is not very significant.

Read the last two sentence of each result

4.2. The forward diameter and velocity

WIA is used to separate the measured pressure, velocity and diameter into the forward and backward components for three types of arterial-plaque system (Fig.3). The forward velocity amplitude of the stable plaque that generated from the heart (ventricle) is slightly higher than that of unstable plaque (0.553 m/s via 0.533 m/s). Similarly, the forward diameter amplitude of stable plaque is also slightly higher than that of unstable plaque (1.04 mm via 0.96 mm).

4.3. The backward diameter and velocity

The backward waves which produced from the reflections are shown in Fig. 4 a and b. It was observed from the figures that the backward velocity and diameter of soft plaque are higher than those for hard plaque are. This phenomenon is opposite to our prediction as the hard plaque should have higher backward reflection than the soft plaque because of their stiffness.

5. Discussion

This study investigated two types of plaques: the FC and TCFA plaques, which represent the hard plaque and soft plaque, respectively. Configuration of these two artificial plaques were referred from the previous studies regarding the plaque characteristics and properties by Guo et al. (2013), Teng et al., (2014) and Butcovan et al. (2016). The data was collected after five minutes of starting the experiment. Each plaque was tested three times in order to ensure the reproducibility. It is as expected that the stable plaques with the higher proportions of Ca is linked with the higher amplitude of the measured diameter, whereas the unstable plaques with the more percentage of lipid core is related to the lower amplitude of the measured diameter. The visible differences of the measured velocity waveforms were observed for two types of the arterial-plaques system with the lowest velocity amplitude occurring at the arterial system with the stable plaque. This means that stable plaques generated the stronger reflected waves, leading to the higher amplitude of the arterial diameter waveform and lower amplitude of the velocity waveforms.

Read the last two sentence of each discussion paragraph

The observations from Fig. 3a shows that the forward velocity in hard plaque is slightly higher than soft plaque. This observation could be explained as the further reflection of the reflected wave was occurring at the inlet of the system, which led to the increase of the velocity. Likewise, the forward diameter amplitude (Fig. 3b) in hard plaque is slightly higher than in soft plaque with the same reason.

The amplitude of backward waveform in the arterial system with hard plaque is expected to be higher than soft plaque because the stiffness of the arterial hard plaque is higher than soft plaque which supposed to produce higher reflection. It has been observed that the backward reflection amplitude of the soft plaque in velocity and diameter is higher than hard plaque (Fig. 4 a and b). These results do not meet our expectation. The reason of this phenomenon could be from further re-reflections from the inlet tube or because the material properties of the artificial artery of the hard plaque is different from the one that used in the soft plaque which do need further investigations.

Read the paragraph before conclusion

Fig. 3. (a) The forward velocity of healthy (blue), hard plaque (black) (FC) and soft plaque (TCFA) (red). The amplitude of velocity for hard plaque is higher than that for soft plaque; (b) The forward diameter of the healthy, hard and soft plaques. The amplitude for hard plaque is higher than that for soft plaque. The double- arrow lines demonstrate how the amplitude is measured.

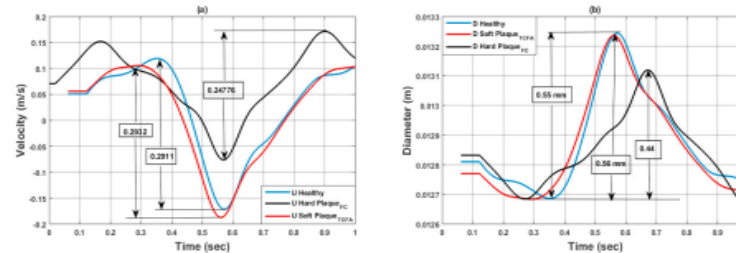


Fig. 4. (a) The backward velocity of healthy (blue), hard plaque (black) (FC) and soft plaque (TCFA) (red). The amplitude for soft plaque is higher than that for hard plaque; (b) The backward diameter of the healthy, hard and soft plaques. The amplitude for soft plaque is also higher than that for hard plaque. These results are not expected and further investigations are needed.

Finally, the limitation of this study is the fact that other types of plaque should be investigated. This may increase the capability of using this technique. Furthermore, the artificial plaque characteristics were fabricated as the same as the real plaque in terms of compositions and dimensions. However, its shape was uniform, which is different from the human carotid arterial plaques observed from clinical studies.

Read the paragraph before conclusion

6. Conclusion

This study demonstrates that the arterial waveform could provide useful information about different types of plaques. The compositions of the plaque are directly related to the waveform properties, which could lead to characterize between stable and vulnerable plaques. Using WIA to separate the waves into forward and backward waves has the potential to distinguish between stable and unstable plaques. Our findings notify that the forward velocity and diameter amplitude in hard plaques is higher than soft plaques. The fact that the backward velocity and diameter amplitude in soft plaque is higher than hard plaque is not expected and needs more investigations. The outcome might assist to distinguish between hard and vulnerable plaques and help the vascular surgeons to make decision precisely.

Read conclusion

Acknowledgement

The work is partially supported by the funding from the Engineering and Physical Science and Research Council (Grant No: EP/R001901/1).

References

- Andrews, J. P. M., Fayad, Z. A., Dweck, M. R., 2018. New methods to image unstable atherosclerotic plaques. *Atherosclerosis* 272, 118–128.
- Butcovan, D., Mocanu, V., Baran, D., Ciurescu, D., Tinica, G., 2016. Assessment of vulnerable and unstable carotid atherosclerotic plaques on endarterectomy specimens. *Experimental and Therapeutic Medicine* 11, 2028–2032.
- Cuadrado, I., Saura, M., Castejon, B., Martin, A. M., Herruzo, I., Balatsos, N., Zamorano, J. M., Zaragoza, C., 2016. The future of Hybrid PET/MR technology for the early detection of vulnerable plaque. *Expert Reviews in Molecular Medicine*, 18.
- Feng, J., Khir, A. W., 2010. Determination of wave speed and wave separation in the arteries using diameter and velocity. *Journal of Biomechanics* 43, 455–462.
- Guo, J. I., Saylor, D. M., Glaser, E. P., Patwardhan, D. V., 2013. Impact of Artificial Plaque Composition on Drug Transport. *Journal of Pharmaceutical sciences* 102, 1905–1914.
- Jashari, F., Ibrahim, P., Johansson, E., Ahlqvist, J., Amerlov, C., Garoff, M., Jaghagen, E. I., Wester, P., Henein, M. Y., 2015. Atherosclerotic Calcification Detection : A Comparative Study of Carotid Ultrasound and Cone Beam CT. *International Journal of*



Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

Research and Report Writing
(RRW)

International
Academic Centre

HOW TO WRITE ACADEMICALLY

- Principles of Academic writing
- Paraphrasing
- Select the attractive title
- Abstract
- How to write introduction
- Writing literature review
- Describe method
- Describe the results
- Justifying the results

Academic writing (normal sentence)

Subject + Verb + Object

- Subject: Nouns / Pronouns
- Verb: V2B/ V2H/ V2D/ MV/ NV
 - V2B: be/ am/ is/ are/ was/ were/ been
 - V2H: have/ has/ had
 - V2D: do/ does/ did/ done
 - MV: can/ could/ may/ might
 - NV: go/ come/ sleep
- Object: Nouns/ Pronouns

Computers save time

Academic sentence

Subject + H + Verb1 + Adverb + Object

- Subject: **Adjective** + Nouns / Pronouns
- H: can/ could/ may/ might/ would/ should/
- Verb1: V2B/ V2H/ V2D/ MV/ NV
 - V2B: be/ am/ is/ are/ was/ were/ been
 - V2H: have/ has/ had
 - V2D: do/ does/ did/ done
 - MV: can/ could/ may/ might
 - NV: go/ come/ sleep
- Adverb: describe the verb normally end with LY (quickly)
- Object: **Adjective** + Nouns/ Pronouns

Modern computers **could** ~~save~~ **significantly** **our time**

Academic sentence

Subject + H + Verb1 + Adverb + Object

- Subject: **Adjective** + Adjective + Nouns / Pronouns
- H: can/ could/ may/ might/ would/ should/
- Verb1: V2B/ V2H/ V2D/ MV/ NV
 - V2B: be/ am/ is/ are/ was/ were/ been
 - V2H: have/ has/ had
 - V2D: do/ does/ did/ done
 - MV: can/ could/ may/ might
 - NV: go/ come/ sleep
- Adverb: describe the verb normally end with LY (quickly)
- Object: **Adjective** + Adjective + Nouns/ Pronouns

The sophisticated Modern computers could save significantly our time

Academic sentence

Subject + H + Verb1 + Adverb + Object

- Subject: **Adverb** + Adjective + Adjective + Nouns / Pronouns
- H: can/ could/ may/ might/ would/ should/
- Verb1: V2B/ V2H/ V2D/ MV/ NV
 - V2B: be/ am/ is/ are/ was/ were/ been
 - V2H: have/ has/ had
 - V2D: do/ does/ did/ done
 - MV: can/ could/ may/ might
 - NV: go/ come/ sleep
- Adverb: describe the verb normally end with LY (quickly)
- Object: **Adverb** + Adjective + Adjective + Nouns/ Pronouns

The very sophisticated Modern computers could save significantly our time

Academic sentence

- **Preposition.**
- It separates between two nouns
- Noun + Prep + Noun
 - Adjective Noun + Prep + Noun
 - Adjective Noun + Prep + Adjective Noun
 - Adjective Adjective **Noun** + Prep + Adjective Adjective **Noun**
 - Adverb Adjective Adjective **Noun** + Prep + adverb Adjective Adjective **Noun**
- It gives more description and explanation for the noun which is before Prep.

The very sophisticated modern computers **in** our daily life **could** save significantly our time.

Academic sentence

- Relative clause:
 - Who/ which:
 - i. People
 - ii. You can use it to describe the subject and the object of the sentence.
 - iii. Subject + Verb + Object.
 - iv. Subject, who/ which + verb + object, + Verb + Object.
 - v. The car is in the garage.
 - vi. The car, which is for my father, is in the garage.
 - vii. Subject + Verb + Object, who/ which + verb + object.
 - viii. The car is in the garage.
 - ix. The car is in the garage, which is locked by my father.
 - x. The police have not found the person.
 - xi. The police have not found the person, who stole my car.

Academic sentence

- That (Subject and Object)
 - i. You do not need commas.
 - ii. Subject + Verb + Object.
 - iii. Subject that + verb + object + Verb + Object.
 - iv. The car is in the garage.
 - v. The car that is for my father is in the garage.
 - vi. Subject + Verb + Object that + verb + object.
 - vii. The car is in the garage.
 - viii. The car is in the garage that is locked by my father.
 - ix. The police have not found the person.
 - x. The police have not found the person that stole my car.

Academic sentence

- Describe the verb
 - That:
 - i. Subject + Verb + Object.
 - ii. Subject + Verb + that + subject + verb + object + Object.

The very sophisticated modern computers in our daily life, **which are available everywhere, could save significantly** our time.

Either the very sophisticated modern computers in our daily life or the interesting smart devices, **which are available everywhere, could save and protect significantly and professionally** the considerably important company time of the big firms and government systems **that is essential in the developed countries.**

Paper - Structure

- A title.
- Abstract.
- Keywords.
- An introduction.
- Method.
- • Results.
- Discussion.
- Limitations.
- Conclusions.
- References/Bibliography.
- Appendices.



How to describe your result

- Result introduction
 - Fig. 4 shows the
 - The is illustrated in Fig. 4
- Result Overview
 - Give starting phrase for your overview
 - Ex: As can be seen from the graph/ it can be seen that
 - Write the result that you want to draw the attention of the reader.
 - Ex: As can be seen from the graph the peak velocity of 1.25 is the highest, while the 1.0 and 0.75 are the second and the third peaks, respectively.
- Description
 - Describe the graph from the beginning to the end with emphasising your main result
- Conclusion
 - Write your hypothesis in indirect way which led to obtain this result

How to describe your result

- Result introduction
- Result Overview
- Description
- Conclusion

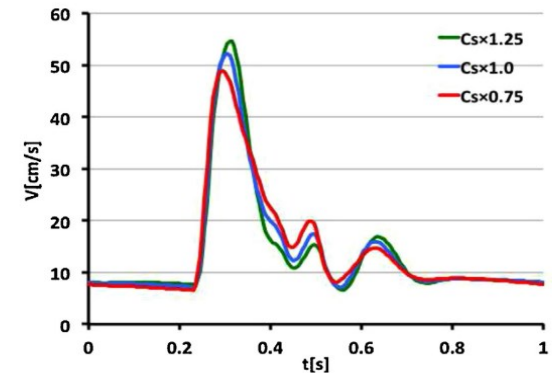


Fig. 10. Simulated CCFVW when the C_s of segments No. 1–No. 55 were decreased or increased uniformly to 25%. For example, $C_s \times 0.75$ means the elasticity of segments decrease 25%.

Figure 10 shows the relationship between the cross-sectional area of the blood vessel and the blood flow. As can be seen from the graph, the peak velocity of 1.25 is the highest, while the 1.0 and 0.75 are the second and the third peaks, respectively. The area of the blood vessels decreases slightly in the first 0.2 second the increase rapidly to reach their different peaks as 1.25 reaches around 55 cm/s, 1.0 at 52 cm/s and 0.75 just below 50 cm/s. Afterward, they decline with fluctuation ending at 9 cm/s in the last period. Therefore, this result indicates that the more area sizes the more flow blood.



Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

Research and Report Writing (RRW)

*International
Academic Centre*

Electrical engineering

<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9405998>

<https://reader.elsevier.com/reader/sd/pii/S0030401820310725?token=A20A8B0B80223DE65F31B4859C9392A85F3A0A6674C97C6364C3EB26C58856E820C61369C3F7FB24C3031A7DEFBB10B8&originRegion=eu-west-1&originCreation=20230308115734>

Mechanical Engineering (Results)

<https://reader.elsevier.com/reader/sd/pii/S0257897221009506?token=41904A108194DCCC2676C45CE0B8C4EB581E4BB69B2665605F42C8B904FB6D47E8694FB61EF8090628E5549C16124851&originRegion=eu-west-1&originCreation=20230308114915>

Bioengineering

<https://www.sciencedirect.com/science/article/pii/S2452321622006345>

How to Justify your result (Discussion)

- Introduction
- Explain your result
- Support your explanation
- Write your contribution

How to Justify your result (Discussion)

➤ Introduction

- Take the introduction and the result of the result and mixed to end up with one sentence
- Example: The correlation between arterial wall movement and the blood velocity in figure 10 indicate that as long as the cross – sectional area increases, the blood flow increases.

How to Justify your result (Discussion)

➤ Explain your result

- Explaining, linking words

i. This can be explained as

ii. The main reason of this is

iii. This result may be explained by the fact that

iv. You can use phrasal bank book

<https://ebooks.hslu.ch/academicwriting/wp-content/uploads/52/2018/07/Academic-Phrasebank-Enhanced-Personal-2015.pdf>

How to Justify your result (Discussion)

➤ Support your explanation

- i. References
- ii. Any facts that you have given should be supported by references.
- iii. The two peaks that observed in Fig. 4a and one peak in Fig. 4b indicate the rupture of the fibrous cap sample which increase with increase of machine load. The reason of these ruptures is because of material properties of plaque. In case of calcified plaque specimen, when the load of machine applied on the specimen circumference which includes FC and Ca (below the FC), the FC will have a high stress (Li et al., 2005) caused by machine load on the top and Ca in the bottom leading to fracture of the FC and it continues to rupture until the Ca becomes flatten.

How to Justify your result (Discussion)

➤ Write your contribution for this result

- Use the RESULT linking words
- Write your contribution (SOLVER)
- You do not need a reference

How to Justify your result (Discussion)

Figure 10 shows the relationship between the cross-sectional area of the blood vessel and the blood flow. As can be seen from the graph, the peak velocity of 1.25 is the highest, while the 1.0 and 0.75 are the second and the third peaks, respectively. The area of the blood vessels decreases slightly in the first 0.2 second the increase rapidly to reach their different peaks as 1.25 reaches around 55 cm/s, 1.0 at 52 cm/s and 0.75 just below 50 cm/s. Afterward, they decline with fluctuation ending at 9 cm/s in the last period. Therefore, the more area sizes the more flow blood.

The correlation between arterial wall movement and the blood flow in figure 10 indicate that as long as the cross – sectional area increases, the blood flow increases. When the blood flow pass the artery with no restriction, the pressure of the blood decreases leading to increase the flow of the blood. This can be supported by the equation of Bernoulli as it indicated that there is a negative relationship between pressure and velocity (Frank, 1990). Therefore, the plaque can be detected by increasing of pressure with decreasing of blood flow.

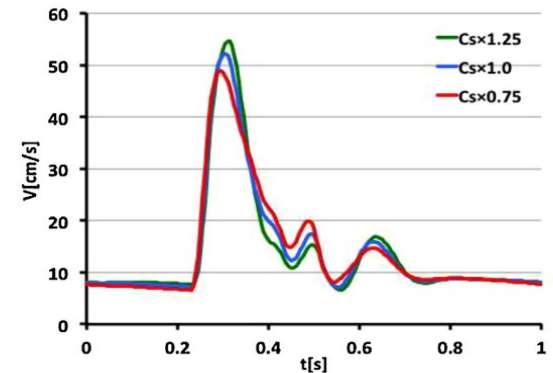


Fig. 10. Simulated CCFVW when the C_s of segments No. 1–No. 55 were decreased or increased uniformly to 25%. For example, $C_s \times 0.75$ means the elasticity of segments decrease 25%.

The correlation between arterial wall movement and the blood flow in figure 10 indicate that as long as the cross – sectional area increases, the blood flow increases. When the blood flow passes the artery with no restriction, the pressure of the blood decreases leading to increase the flow of the blood. (Frank, 1990). Therefore, the plaque can be detected by increasing of pressure with decreasing of blood flow.



Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

**Research and Report Writing
(RRW)**

*International
Academic Centre*

<https://www.sciencedirect.com/science/article/pii/S1751616121001764>

<https://link.springer.com/article/10.1007/s43938-023-00022-9>

[Academiv-Phrase-Bank.pdf](#)

Paper - Structure

- A title.
- Abstract.
- Keywords.
- An introduction.
- **Method.**
- **Results.**
- **Discussion.**
- **Limitations.**
- Conclusions.
- References/Bibliography.
- Appendices.



How to describe your method

➤ Past passive voice

- **Object** + was/ were + **past participle** + **by Subject** + **complement**
- Ex: I break the window
- **The window** is **broken** **by me**

Using the passive voice also allows you to:

- direct the audience to focus on the information or argument being presented, and not on the writer or speaker
 - omit any mention of the actor or agent where it is unimportant or unknown
 - place certain material at the end of the clause so that it may receive the emphasis of final position.
- Write everything you did

How to describe your method

- Draw the experiment
 - Write paragraph/ paragraphs to illustrate every part of the experiment.
 - Write the company of each part
 - Write the type of equipment
 - Write the function of each part

How to describe your method

➤ Material

- Write each material you did it in your experiment
- Write the company of each material
- Write the type of material
- Write the function of each material

How to describe your method

➤ Procedure

- Write every single step you did in your experiment
- Do not forget to write it in past passive voice
- Write the false method because this may help researchers who read your report to avoid this mistake

➤ When you write your method, you should put in your consideration that when the readers try to mimic your method, they can get the same results

How to describe your method

➤ Participants

- How many participants were recruited?
- Say how you obtained your sample (e.g. opportunity sample).
- Give relevant demographic details, e.g. gender, ethnicity, age range, mean age, and standard deviation.

Paper - Structure

- A title.
- Abstract.
- Keywords.
- An introduction.
- **Method.**
- **Results.**
- **Discussion.**
- **Limitations.**
- Conclusions.
- References/Bibliography.
- Appendices.



Paper - Structure

- A title.
- Abstract.
- Keywords.
- **An introduction.**
- **Method.**
- **Results.**
- **Discussion.**
- **Limitations.**
- Conclusions.
- References/Bibliography.
- Appendices.



Introduction

- A statement or 'hook' to gain the reader's interest.
- Contextualizing material which means to provide relevant background information.
- Topic and focus of the paper.
- The rationale means the reason for writing the paper.
- An indicating of the paper's main references.
- It may also be necessary to define any central concept.
- The main aim.
- The objectives.



[Google Scholar](https://scholar.google.com)

Paraphrasing

1. Passive and active voice
2. From adjective to adverb / Adjective + Prep + noun
3. Understand the text and write your own way and words
4. Word to word way

Passive and active voice

Ex: PhD students prepared six samples in the lab

ANS: Six specimens were prepared in the lab by PhD students

From adjective to adverb

Ex: There was a slight increase in oil prices in the world

ANS: The oil prices increased slightly in the world

ANS: The prices of oil increased slightly in the world

Word to word

You can use Google Translator

Literature Review

- Firstly, you need to know how to write the reference
- As a subject
- One author, write the surname and the year
- Abdulsalam, (2022)
- Two authors, write the surnames of the authors, then year
- Abdulsalam and Feng, (2019)
- More than two authors, write the surname of the 1st author and et al., then year
- Abdulsalam et al., (2020)
- In the object
- One author (Abdulsalam, 2022)
- Two authors (Abdulsalam and Feng, 2019)
- More than two authors (Abdulsalam et al., 2020)
- **Surname, Initial 1st name., , Year. Paper Title. Name of the Journal. Volume (Issue), Pages**
- Akbari, M., Tamayol, A., Laforte, V., Annabi, N., Najafabadi, A.H., Khademhosseini, A., Juncker, D., 2014.
Composite living fibers for creating tissue constructs using textile techniques. *J. AFM*. 11 (24), 4060–4067

Literature Review

The structure of writing literature for one studies.

1. Present the study by using passive or active voice
2. Write the positive aspect of this study (Probably the last two sentences in conclusion)
3. Write the limitation of this study (it can be found in the paragraph before conclusion)

PRESENTING THE STUDY (ACTIVE)

Subject + Verb + Object

- Subject = Author name and year
- Verb: The verb of study aim (Paraphrase)
- Object = Either the object of the study aim or the study conclusion

Example: **Abdulsalam (2019)** has studied the correlation between lesion components and arterial waveform

Literature Review

Presenting the study in passive voice way (One study)

Object + Verb to be + Past participle + by subject + Complement

- Object = aim/ Q research/ Method
- Past participle = part of aim or Q research
- by subject = Author
- Complement = Results/ conclusion

Example: Distinguishing between stable and vulnerable plaques have been investigated by Abdulsalam (2019)¹.

Literature Review

Write the positive aspect of this study

Write the limitation of this study

<https://www.sciencedirect.com/science/article/pii/S2452321619301088>

This study However,

No	Main author(Year)	Main aim	conclusion	limitation
1	M. Abdulsalam (2019)	The main aim of this work is to determine the relationship that exists between plaque composition and arterial waveform for distinguishing stable and vulnerable plaques.	The fact that the backward velocity and diameter amplitude in soft plaque is higher than hard plaque is not expected and needs more investigations. The outcome might assist to distinguish between hard and vulnerable plaques and help the vascular surgeons to make decision precisely.	Two types of plaques only its shape was uniform

1. Present the study by using passive or active voice
2. Write the positive aspect of this study (Probably the last two sentences in conclusion)
3. Write the limitation of this study (it can be found in the paragraph before conclusion)

Distinguishing between stable and vulnerable plaques have been investigated by Abdulsalam (2019)¹. This study provide information to differentiate between stable and soft plaques and assist the vascular doctors to create decision accurately².

However, this study investigates only two types of plaques and the shape of the plaques are uniform which are not similar to the real one³.

Literature Review

If you have two studies which one of them is opposite to other, you can use although

Although = Even though + Sub + Verb + Object, Sub + Verb + Object

Despite = In spite of + noun, Sub + Verb + Object

Despite = In spite of the fact that + Sub + Verb + Object , Sub + Verb + Object

Example: Although supporting banks with money by government would reduce the financial crisis (Hamuda et al 2010; Abdulsalam et al., 2008; Hafedah et al 2009), Ali and Mohamed (2010); Sarah et al., (2011) claimed that this support would probably increase the crisis.

Literature Review

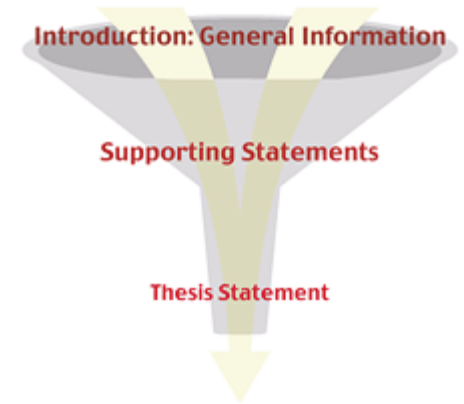
Literature Review Storey way

1. Present the study/ studies by using passive or active voice (explained)
2. Write the positive aspect of this study/ studies (Probably the last two sentences in conclusion)
3. Write the limitation of this study/ studies (it can be found in the paragraph before conclusion)
4. Present the study/ studies by using passive or active voice (explained above) that amend the limitation of the previous study/ studies
5. Write the positive aspect of this study/ studies (Probably the last two sentences in conclusion)
6. Write the limitation of this study/ studies (it can be found in the paragraph before conclusion)

Distinguishing between stable and vulnerable plaques have been investigated by Abdulsalam (2019)¹. This study support to differentiate between stable and soft plaques and assist the vascular doctors to create decision accurately². However, this study investigates only two types of plaques and the shape of the plaques are uniform which are not similar to the real one³. This shape of plaque has been modified to be close to the real one by Badi (2022)⁴. His study provides information about how to reduce the stroke risk which might help to decline the rate of fatal⁵. Yet, the intensity of the waves were not clear because of complex waveform⁶.

Introduction

- **A statement or 'hook' to gain the reader's interest.**
- **Contextualizing material which means to provide relevant background information.**
- Topic and focus of the paper.
- The rationale means the reason for writing the paper.
- An indicating of the paper's main references.
- It may also be necessary to define any central concept.
- The main aim.
- The objectives.





Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

Research and Report Writing (RRW)

*International
Academic Centre*

In the field of business, customers are the major factor in every organisation. To delight customers or even satisfy them, Quality Function Deployment (QFD) is the right tool to fulfil. QFD is the way to transform users (customers) requirement to quantitative parameter. After World War II the QFD was existed by Yoji Akao and Shigeru Mizuno in Japan exactly in 1966, but it was implemented in the Mitsudishi's Kobi in 1972 (Husan, 2003). Other Japanese companies such as Toyota and its suppliers were later adopted and developed it (Kana, 2004). In 1980, QFD became increasingly widespread in the world, particularly in the western world. Quality Function Deployment concentrates on Voice of Customers (VOC) in order to deploy a system in the product planning and design stages(Akao,1999). Employers, however, should take into their account the customers desires by using questionnaire, survey and interviews through marketing department and treated to be at top priority. This is called as Customer Requirements (CRs). QFD aims to ensure that the product is in good quality and meet customers satisfaction before manufacturing(Akao,1999). One of QFD techniques is House of Quality (HOF). It is a diagram which looks like a house with some columns and rows on it. Those columns and rows use to evaluate the relationship between Customer Requirements and Engineering Characteristics (ECs) in the first House of Quality. The rows represent CRs and columns demonstrate ECs, the arrays between them show how strong and weak the relationship between them. The rows in each house can be named as 'What' and the columns as 'How' which means what is required and how could be implemented. The second house which called parts deployment contains Engineering Characteristics which placed in the row side and product design requirements in the column side, while the third house gives information about process planning and WHAT are product design requirements and HOW the product processes and planning. The final house of quality displays the operation requirements from process design requirements to operation planning requirements. The roof of the house matrix offers the relation between each columns (How vs. How), the indicator of relationship between them can be strong positive, strong negative or somewhere in between. It is widely believed that using QFD in any products could help to narrow the gap between customer expectation and the quality of the product. Hence, this essay focuses on electrical kettle in term of development and increase the quality of product. The main way of collecting customers expectation was in Questionnaire. As customers judge the quality by their perceptions, it might be difficult to measure their satisfaction precisely. Quality Function Deployment (QFD) is the best way to measure customer satisfaction which is used in this paper to meet customer requirement and illustrates the steps that achieves our goal by using House Of Quality. The main aim of this paper is to develop water electric kettle to be more convenient, healthy and reliable for customers. To obtain the main aim of this study; major objectives of this report are undertaken as follow: product investigating; positive and negative questionnaire of the product; prepare the four house of quality and analysis them to acquire the results.

Paper - Structure

- A title.
- Abstract.
- Keywords.
- An introduction.
- Method.
- Results.
- Discussion.
- Limitations.
- Conclusions.
- References/Bibliography.
- Appendices.



Title

➤ Your title should reflect

- Topic
- Aim
- Method
- Main result

➤ Example:

1. Stent
 2. The effects of plaque compositions on the stent
 3. In vitro – Wave intensity Analysis
 4. Lipid plaque is the riskiest one
- The effect of plaque composition on stent to distinguish the risky plaque type using Wave intensity Analysis

Paper - Structure

- **A title.**
- **Abstract.**
- Keywords.
- **An introduction.**
- **Method.**
- **Results.**
- **Discussion.**
- **Limitations.**
- Conclusions.
- References/Bibliography.
- Appendices.





Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

Research and Report Writing
(RRW)

*International
Academic Centre*

Abstract

An abstract provides a brief overview of the experiment, including its findings and conclusions.

In general the abstract should answer six questions:

- 1. Why was the experiment conducted? (big-picture/real-world view).**
- 2. What specific problem/research question was being addressed?**
- 3. What methods were used to solve the problem/answer the question?**
- 4. What results were obtained?**
- 5. What do these results mean?**
- 6. How do they answer the overall question or improve our understanding of the problem?**



Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

Research and Report Writing
(RRW)

International
Academic Centre

Abstract

➤ Abstract:

- Informative abstract (science and some of medical)
- Descriptive abstract (humanity)

Abstract

- Informative abstract (science) No more than 250 words
- Define the problem
- What is the consequences if not solving this problem
- The main aim
- Method
- Main results
- Interpret the main result
- conclusion

Abstract

- Informative abstract (Medical)
 - Define the problem
 - What is the consequences of not solving this problem
 - The main aim
 - Method
 - ~~Main results~~
 - ~~Interpret the main result~~
 - Conclusion with model verbs
 - No more than 250 words

Abstract

- Descriptive abstract
- Define the topic/ problem
- The main aim
- **Method**
- Main result
- **Conclusion**
- No more than 200 words



Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

Research and Report Writing (RRW)

*International
Academic Centre*

https://www.sciencedirect.com/science/article/pii/S0167739X13001593?casa_token=dCel_VOfROsAAAAA:4RXSutbxlg5RbndLVxCNu-JmJACcouwQH8NxEYqty5pWxFY8PbDrrBsleCUiCY1BcDAECT19lsk

<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9434936>

Mechanical Engineering (Results)

<https://reader.elsevier.com/reader/sd/pii/S0257897221009506?token=41904A108194DCCC2676C45CE0B8C4EB581E4BB69B2665605F42C8B904FB6D47E8694FB61EF8090628E5549C16124851&originRegion=eu-west-1&originCreation=20230308114915>

Otorhinolaryngology

<file:///C:/Users/Oem/Downloads/s40463-022-00615-4.pdf>

Dentistry

<file:///C:/Users/Oem/Downloads/MAOSMANetal.005.pdf>

Education

<https://journals.sagepub.com/doi/epub/10.1177/00220574221130954>

Bioengineering

<https://www.sciencedirect.com/science/article/pii/S2452321622006345>

Paper - Structure

- **A title.**
- **Abstract.**
- **Keywords.**
- **An introduction.**
- **Method.**
- **Results.**
- **Discussion.**
- **Limitations.**
- **Conclusions.**
- **References/Bibliography.**
- **Appendices.**





Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

Research and Report Writing
(RRW)

International
Academic Centre

Conclusion

The conclusion section should provide a take-home message summing up how your work contribute to the knowledge:

- 1. Briefly restate the purpose of the writing this paper (the question it was seeking to answer)**
- 2. Identify the main findings (answer to the research question)**
- 3. Note the main limitations that are relevant to the interpretation of the results**
- 4. Summarise what the paper has contributed to your understanding of the problem.**



Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

**Research and Report Writing
(RRW)**

*International
Academic Centre*

[Crack propagation of a thin hard coating under cyclic loading: Irreversible cohesive zone model - ScienceDirect](#)

[Determinants of Learning Outcome in the Nigerian Primary Schools \(sagepub.com\)](#)

[In vitro study of the deployment performance of 3D printed stents in the diseased artery with the lipid arterial plaques - ScienceDirect](#)

[IEEE Xplore Full-Text PDF:](#)

Paper - Structure

- **A title.**
- **Abstract.**
- **Keywords.**
- **An introduction.**
- **Method.**
- **Results.**
- **Discussion.**
- **Limitations.**
- **Conclusions.**
- **References/Bibliography.**
- **Appendices.**





Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

**Research and Report Writing
(RRW)**

*International
Academic Centre*

Reference style using Mendeley

<https://www.mendeley.com/download-desktop-new/>

Paper - Structure

- A title.
- Abstract.
- Keywords.
- An introduction.
- Method.
- Results.
- Discussion.
- Limitations.
- Conclusions.
- References/Bibliography.
- Appendices.





Mobile: +44 (0) 7806687071
Mobile: +44 (0) 7383080830
Email: Info@iac-uk.com
Website: iac-uk.com

Research and Report Writing
(RRW)

*International
Academic Centre*

