

# THE DESIGN AND PRESENTATION OF A CASE STUDY

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## INTRODUCTION

Case studies are a much maligned area of scientific publication. However, they do form the initial basis of scientific knowledge, which can lead to further hypothesis for investigation.

There are over 2500 chiropractors/osteopaths in Australia with an estimated 15 million patient visits per year<sup>(1)</sup>. Yet published case studies involving chiropractor/osteopath patients are minimal. Chiropractors/osteopaths often have many interesting cases to discuss and present, however, some practitioners are uncertain of the best procedure to publish these case reports. As a consequence, it would appear that many conditions that have anecdotal support, have little if any scientific support<sup>(2)</sup>.

One purpose of this paper is to present the standard features of case studies and to develop a criteria check-list to evaluate the quality of case studies published. In addition, the paper is designed to facilitate the publication of more case studies by chiropractors/osteopaths about the patients they consult in their practices.

Practitioners will gain more information about conditions that they encounter through a number of mechanisms. First, by reviewing the literature on the condition when they prepare to write the case study. Secondly, through reading other published case reports. Thirdly, when reading a case study it may motivate the practitioner to review any similar cases that they encountered in their own practice for comparison of their diagnosis and outcome of treatment. Finally, by discussing case reports they have read with other patients, there may be a chance of similar case referral through these patients.

Another area for consideration is preparation of grant applications. The application often includes questions on

previous publications by the author or if there are other publications in the area research that is applicable to the grant. For example, with an Australian Spinal Research Foundation grant for chiropractic and migraine, a literature review revealed only one large randomised controlled trial, and only a few case studies. This can make the success of the grant application less likely because there is little support for the need to research the area, as well as few indications that research will reveal any benefits<sup>(3)</sup>.

However, by far the most important aspect is documentation of anecdotal evidence of clinical improvement of individual patients. If well presented case studies with strong objective evidence can be published in sufficient numbers, then this becomes scientific evidence.

## CASE STUDY PRESENTATION

The abstract precedes the body of the paper. It must be concise and clear, as many readers will determine whether they read the whole paper on the strength of the abstract. In performing literature reviews, many researchers frequently scan hundreds if not thousands of abstracts. Therefore, a well structured abstract may determine the usefulness of the whole paper.

A structured abstract is usually required for case study presentation, with the following sections included: Objective; Clinical features; Intervention & Outcome; Conclusion.

**Objective:** To present and review the information of an unusual or interesting case study. Generally the objective states what the case study will be reporting about, ie a patient that had rare, unusual or interesting features. Conversely, the patient may have had a very good or bad response to treatment for a more common condition.

**Clinical features:** This usually involves detailing the unique aspects of the patient's symptoms or signs. The section usually contains the important clinical features of the case including the patient history, physical examination results, neurological and orthopaedic findings, and other investigations (eg radiographs, blood or pathology tests, etc).

**Intervention & Outcome:** Description of the intervention/treatment and details of how the outcome of treatment was measured.

**Conclusion:** The results of the intervention and any other information, which is relevant for practitioners that may have similar cases. It is common to discuss what

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practitioners should note about the case or other recommendations for similar cases that they may encounter.

**Key Indexing Terms - Medical Subject Headings (MeSH):**  
Three to five medical subject headings or terms used for indexing the paper for database retrieval.

Figure 1.

CHECK LIST	
Review your case presentation to assess whether each issue has been addressed. Some issues may not be easily identified, however, the more information that can be included, the stronger the paper becomes.	
1. INTRODUCTION	
DEFINITION	•
MOST SUSCEPTIBLE	•
DESCRIPTION	•
AT RISK GROUP	•
INCIDENCE	•
MORBIDITY/MORTALITY	•
AETIOLOGY	•
NATURAL HISTORY	•
2. CASE FEATURES	
DESCRIPTIVE FEATURES	•
CLINICAL HISTORY	•
EXAMINATION FINDINGS	•
OBJECTIVE TESTS	•
SPECIFIC TESTS	•
3. TREATMENT	
MANIPULATION:	
TYPE(S)	•
AREAS	•
ANCILLARY THERAPY	• YES • NO
EXERCISE	• YES • NO
MEDICAL TREATMENT	• YES • NO
CO-MANAGEMENT (IF ANY)	• YES • NO
REFERRAL (WHO &/OR WHY)	• YES • NO
PREVENTATIVE MEASURES	• YES • NO
4. DISCUSSION	
ALTERNATIVE TREATMENT	•
POTENTIAL FOR MISDIAGNOSIS	•
CHIROPRACTIC SIGNIFICANCE	•
OTHER FEATURES .....	
5. CONCLUSION	
SUMMARY OF CASE (1-2 PARAGRAPHS)	
6. REFERENCES	
SEE JOURNAL FOR CONFORMITY TO CORRECT METHOD	

Case studies will usually contain the following information, which is compiled in the sections detailed in the rest of this paper. A checklist has been included to allow the reader to review other case studies for their thoroughness and to provide a template for more case study publications.

### 1. INTRODUCTION

This section usually includes background information, including what the condition is, statistics on prevalence or incidence, who are likely to be affected and when, the severity of the problem, mechanisms of how the condition develops, potential causes of problem and how well the aetiological factors have been tested for causal relationships<sup>(4)</sup>.

It may also be appropriate to detail “at risk” groups, with particular reference to patients that commonly present with spinal pain or for SMT treatment.

In addition, the introduction usually has a literature review of standard features for these types of cases, including any “gold standard” for diagnosis. In conditions where a “gold standard” is not clearly identified or accepted, details should be given of how alternative methods of diagnosis have been developed or tested<sup>(5)</sup>.

There may also be information regarding studies of patients undergoing SMT for the same or similar conditions. It is important to include this literature review information because previous knowledge of the readers of the case study may be quite different to what is currently presented.

### 2. CASE FEATURES

This section contains all the important clinical features of the case including the patient history, physical examination results, neurological and orthopaedic findings, and other investigations (eg radiographs, blood or pathology tests, etc). Enough information should also be included to give other practitioners a clear understanding of the background information for the patient.

The following represents a typical history of a case study for publication. It typically includes:

i) A description of the presenting symptom(s); area of distribution; radiation of pain; paraesthesia or other sensory disturbance; causative factors; frequency and duration of symptom; aggravating and alleviating factors; 24 hour symptom distribution.

ii) A clinical history which includes: operations; hospitalisations; serious illnesses; medications; accidents or falls; fractures; previous treatments or tests; radiographs; relevant specialist consultations; and familial tendencies.

iii) A “Systems review” including: History of headaches; ear, nose or throat conditions, gastrointestinal history; heart or lung conditions; bowel conditions; genito-urinary system; endocrine function, orthopaedic and neurologic status and dermatological conditions.

iv) The following vascular investigations are usually noted as well: Vertebral artery test; provocation test (eg. stressing the cervical spine in a pre-SMT position to evaluate potential vertebrobasilar insufficiency); blood pressure assessment; abdominal aortic aneurysm screen.

In addition, this section usually involves detailing the unique or confusing aspects of the patients symptoms/signs, with particular reference to any objective tests that were performed. Case studies that have more objective tests such as spirometry, Doppler blood flow findings,

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nerve conduction tests, EMG, are often more significant due to their outcome measures being removed from the practitioner control.

By convention, it is standard to only include the positive findings, unless a negative test result for this type of condition is very uncommon. For example, if a straight leg raise test was negative, when there is clear CT scan evidence of a disc prolapse. It would then be appropriate to discuss possible reasons for this difference in the discussion or conclusion sections.

In addition any other tests performed for exclusion of orthopaedic and/or neurological contraindications to spinal manipulation therapy (SMT) should be noted. Such tests depend on the region under investigation and the nature of the manipulative intervention considered.

### 3. TREATMENT

The section contains all the important treatment features of the case including the types and areas for SMT. It is also appropriate to detail any variation to standard procedures or techniques to give the reader a full appreciation of what the treatment encompassed. One should also keep in mind that potential readers of the paper may be ignorant of specific “jargon” of a profession. Therefore, it is important to keep any “jargon” to a minimum or to clearly define what the terms mean. For example, a basic lumbar roll position pisiform contact inferior thrust (BLR/Inf pisif) may be clear to some of the chiropractic profession, but very confusing “jargon” to some members of the osteopathic profession.

Were other types of treatment, eg ancillary therapies such as electro-physical therapies (EPT), massage, proprioceptive neuromuscular facilitation (PNF), traction, included in the SMT treatment? One would also discuss why these other treatments were performed in the next section of the paper. In addition, other advice or preventative measures which were given to the patient should be documented, such as exercises, postural changes, lifting advice, etc.

These details help the reader to determine which aspect of treatment may have led to the change in the patient’s condition. For example, if the reader has treated a patient with a similar condition and the result was less than favourable, then the reader may need to follow the same treatment plan for future patients with this condition.

Where it was inappropriate or contra-indicated to proceed with SMT, was there a need for referral to another practitioner? If so, what was the subsequent response to treatment for the patient? Is this a case for potential co-management between the chiropractic/osteopathic professions and other professions?

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It is important to detail the type of manipulation/adjustment performed and if there was any variation to standard SMT procedures, so other practitioners can be alerted if they encounter similar patients. This is also relevant for ancillary therapies, exercise, medical treatment or referral and any other preventative measures that may have been necessary for the patient.

### 4. DISCUSSION

An important area of the case study is the discussion section, which examines possible types of treatment which were available and why a particular treatment was chosen. It is appropriate to outline what features lead the author to make the diagnosis and if there were other features that led them to the choice of treatment. For example, a 1995 paper on cervical radiculopathy highlighted two cases with very similar symptoms, but with totally different treatments. One case was a patient with a cervical disc prolapse causing neck and arm pain which was compared to a case of identical symptoms due to an infraspinatus trigger point <sup>(6)</sup>.

This section would also outline any potential for a practitioner to misdiagnose the condition and what needs to be covered to avoid this possibility <sup>(7)</sup>. For example, patients that present with migraine that may in fact have an intracranial space occupying lesion, or benign intracranial hypertension, need a MRI/CT scan for a differential diagnosis. Reliance just on blood pressure changes may be inadequate, as well as reliance on headache pain description such as “the worst headache I have experienced”, could prove negligent.

It is also appropriate to discuss other possible types of treatment, whether it is a different form of manual therapy (physiotherapy, massage) or medical treatment such as alteration in pharmaceuticals <sup>(8)</sup>.

The most important aspect to discuss is the chiropractic/osteopathic significance of the case. That is, why should chiropractor/osteopaths be aware of these cases, what do they need to note/remember if they encounter similar cases. For example, a paper included in this journal discusses a case of Leptomenigeal disease that presented as lumbar nerve root radiculopathy <sup>(9)</sup>.

### 5. CONCLUSION

This section is usually a short summary of the results of the intervention and any other information which is relevant for practitioners that may have similar cases.

### 6. REFERENCES

References for the case studies should be cited by the methods employed by the journal that the author wished

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the paper to be published. For example, Australasian Chiropractic & Osteopathy uses the following system, which is also noted under the "Instructions for authors".

There are several methods used for referencing, which include consecutive numbering of references as they are cited in the paper; alphabetic reference lists; citation of author and year of publication after each point.

The following are examples of references used by Australasian Chiropractic & Osteopathy, (these are detailed in each edition):

### Chapter reference

Bogduk N. Cervical causes of headache and dizziness. In: Greive GP (ed) Modern manual therapy of the vertebral column. 2nd ed 1994. Churchill Livingstone, Edinburgh. p317-31.

### Organisation authorship

Headache Classification Committee of the International Headache Society. Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. Cephalgia 1988, 9. Suppl. 7: 1-93.

### Journal articles

Tuchin PJ. The efficacy of chiropractic spinal manipulative therapy (SMT) in the treatment of migraine - a pilot study. Aust Chiro & Osteo 1997; 6: 41-7.

Kidd R, Nelson C. Musculoskeletal dysfunction of the neck in migraine and tension headache. Headache 1993; 33: 566-9.

Tuchin PJ, Bonello R. Classic migraine or not classic migraine, that is the question. Aust Chiro & Osteo 1996; 5: 66-74.

Tuchin PJ, Bonello R. Preliminary Findings of Analysis of Chiropractic Utilisation and Cost in the Workers Compensation System of New South Wales. J Manipulative Physiol Ther 1995; 18: 503-11.

## REFERENCE ADVICE

It is recommended to use modern texts or current scientific publications for references relating to the introduction section. For example, if you wish to cite the incidence or prevalence of a disease then a recent text on diagnosis may be the most appropriate.

Relating to the treatment section it may be more appropriate to use modern chiropractic texts or current scientific publications specific to chiropractic or other manual

therapy. In addition, recent seminar/conference published proceedings may also be appropriate.

In the discussion section, you may refer to other published case studies, review papers or clinical trials, as these may discuss recent advances in diagnosis or treatment.

It is appropriate to use the Internet for a literature review, however, it is strongly recommended that you read the entire paper before citing it to reference a particular point, as the paper/study may be deficient in its methodology, thus rendering the publication useless. An example of this is a paper with strong conclusions for the result of treatment, but based on a very small sample size.

## CASE STUDY EXAMPLES

Cases that are more likely to be interesting enough to be reviewed for publication are ones that have the following features:

Cases with well documented histories or that include objective test results. This may include cases where patients have consulted many practitioners and have evidence of objective findings, such as: CT, MRI, PET, Doppler, nerve conduction tests, spirometry, blood tests, etc<sup>(8)</sup>.

Cases with clinical history of a severe incident such as: an MVA, other major trauma, major symptoms eg fractured vertebrae. An example of this is a patient of one of the authors (PJT) who presented with bilateral arm pain and parathesias, neck pain, headaches, low back pain, sexual dysfunction, and some leg pain following a surfing accident where he received a C6 vertebral body compression fracture. All symptoms cleared following chiropractic SMT.

Cases with a long (chronic) history of the problem that shows a well established pattern, where any change to the pattern can be clearly shown. This will help establish that the intervention must have been significant in altering the condition. An example of this is a patient of mine who presented with migraine headaches and neck pain, that first commenced 60 years earlier. The patient would experience a migraine at least once a week, which included nausea, photophobia and the need to seek a quiet dark room for a minimum of 12 hours. All migraines cleared following chiropractic SMT, to the stage where she hasn't reported a migraine for over 16 months.

Cases with severe physical findings eg structural scoliosis, DJD, other systemic conditions that have good/clear Xray features (AS, RA, congenital defects). An example of this is a patient of Dr Ken McAviney who presented with a idiopathic scoliosis of more than 40 degrees (Cobb angle), which was increasing at almost 1 degree per month. The progression of the scoliosis was stopped and an

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improvement of Cobb angle was achieved following chiropractic SMT.

Cases with disabilities such as Downs, CVA, paraplegia, spina bifida or cases with “type O” conditions asthma, migraine, sinusitis, colic, bed wetting, PMT, infertility, tinnitus. In addition, cases where the diagnosis of the pathology (eg MS, Ca, SOL) was initially made by a chiropractor/osteopath.

Cases where a rare (and often serious) condition mimics a common problem. An example of this is a case presented in this journal where a person had Leptomenigeal disease but presented as they had a case of lumbar nerve root radiculopathy<sup>(9)</sup>. Cases with well known celebrities having treatment. These often receive more “press” coverage due to the fame of the individual, but they do have the ability to raise the profile of treatment for the condition. A recent example of this is Belinda Emmett and her treatment for breast cancer. Naturally ethical considerations and the need for patient confidentiality demand that special approval is obtained prior to the inclusion of any name in the submission. Additionally, it would be appropriate to acknowledge the generosity of the patient in allowing his/her name to be included in the paper.

## CONCLUSION

It is hoped that this paper may encourage and help practitioners to “put pen to paper” and submit case studies for review and potential publication.

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