

SNAP, CRACKLE & POP: A NORMAL VARIANT OF INCREASED INSERTIONAL ACTIVITY: MAY BE MISLEADING FOR ELECTROMYOGRAPHER

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ABSTRACT

Objectives: To describe the findings of Snap Crackle and Pop in different patients referred for electromyographic evaluation.

Methodology: From August 2007 to December 2010 total of 2098 patients were referred to neurophysiology laboratory for evaluation in three different hospitals namely The Aga Khan University Hospital, Karachi, Pakistan, Liaquat University of Medical and Health Sciences, Jamshoro, Sindh, Pakistan and Armed Forces Hospital Southern Region, Khamis Mushayt, Saudi Arabia. Electromyography (EMG) needle examination was done by single electromyographer in the above mentioned hospitals. EMG findings were then confirmed by qualified consultant Clinical Neurophysiologist. Clinical information and EMG data were collected in text form.

Results: Out of 2098 patients only 4 patients showed characteristic EMG findings of Snap Crackle and Pop. All 4 patients were male and they are giving history of vigorous exercise. All four patient exhibit abnormal insertional activity with diffuse positive sharp waves in different muscles. In one patient occasional fibrillation potentials were noted.

Conclusion: Snap Crackle and Pop is rare disorder in male gender. Having characteristic EMG findings and can be misinterpreted easily.

Key Words: Snap, Crackle, Pop, Electromyographic evaluation.

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INTRODUCTION

The three elf¹ characters were originally designed by illustrator Vernon Grant and made their debut in 1933. The names of the elves are derived from a Rice Krispies radio advertisement. The advertisement said "Listen to the fairy song of health, the merry chorus sung by Kellogg's Rice Krispies as they merrily snap, crackle, and pop in a bowl of milk. If you've never heard food talking, now is your chance." Inspired by this

advertisement, Vernon Grant drew three elves and named them as Snap, Crackle, and Pop.

Placing needle recording electrode into muscle tissue and advancing it in quick but short intervals "JABS" results in brief bursts of electrical potentials. This results in a crispy sound, with a series of negative and positive spikes. These waves are referred as insertional activity; the total time duration of this activity after needle cessation has a mean of 48 ± 18 milliseconds². This time duration is different with type of needles, for monopolar needle it is less than 230 milliseconds and is less than 300 milliseconds for concentric needles. If this activity is more than 300-500 milliseconds, then it is indicating pathology in nerve or muscle (neuropathic or myopathic process) and called as active denervation. Very rarely this prolongation in duration of insertional activity as well as diffuse positive sharp waves and fibrillation potentials can be seen as a normal variant, which is called as Snap Crackle & Pop³. This is usually seen in young male patients, having history of body building (muscle making exercises).

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In this case series we reported few cases which showed characteristic EMG findings of Snap Crackle & Pop who were referred for EMG evaluation due to different complains.

DESCRIPTION OF CASES

Patient No. 01:

A 28 years old male patient with the history of hemodialysis through femoral catheterization, five days ago and now presented with right inguinal pain and difficulty in hip flexion. Clinical examination, well built muscle bulk, he was feeling pain in flexing the thigh over hip joint and local swelling with tenderness, rest of the examination was normal. Nerve conduction study, including the right femoral nerve was normal. Needle EMG assessment showed increased insertional activity, including genioglossus muscle, with normal morphology of motor unit action potentials, normal recruitment and full interference pattern, except the recruitment of right vastus medialis muscle because of pain, patient was not applying the proper force.

Patient No. 02:

A 35 years overweight male patient, referred for body aches and pains approximately for last 2 ½ years. He was not diabetic and there was no family history of such illness. He told that at the teen age, he used to do body building exercises. Neurologic clinical assessment was normal. Nerve conduction study was normal. Needle EMG assessment showed increased insertional activity, including genioglossus muscle, with normal morphology of motor unit action potentials, normal recruitment and full interference pattern.

Patient No. 03:

The data of this young patient was retrospectively collected from the patient record. He has been referred for pain and numbness in both hands, however neurologic examination was normal. Needle EMG assessment showed increased insertional activity, including genioglossus muscle, with normal morphology of motor unit action potentials, normal recruitment and full interference pattern. However nerve conduction studies revealed bilateral moderate carpal tunnel syndrome.

Patient No. 04:

This 24 years old Kabbady (local sports involving heavy muscle efforts) player, came for the assessment of some possible injury to left peroneal nerve during local match, nerve conduction study was normal (study done within 8 days of injury) and suggested to repeat the study

after two weeks duration. The needle EMG findings showed positive sharp waves in most of the limb muscles as well as frontalis muscle.

DISCUSSION

Due to lack of proper training programs in the field of neurophysiology, probably practicing neurologists and clinical neurophysiologists are facing difficulties to recognize this normal variant. Rarity of this entity is another factor, that most of the neurophysiologists are not aware. This misinterpretation can lead to wrong diagnosis of crucial neurological disorders like Motor Neuron Disease, motor neuronopathy or inflammatory myopathies resulting in mental stress for the patients and also erroneous management as well as medico legal problems. Very few cases of Snap Crackle & Pop were reported in literature, first case report published in 1982⁴ and subsequently few more cases were reported and they labeled this as a normal variant⁵.

As normal time duration of insertional activity varies among the individuals, different races, regions and built of patients. In different studies the time duration is variable, ranging from 18-500 milliseconds. Like other investigating procedures electromyography is also dependent on the examiner. Other than this there are many technical factors which may affect the test^{6,7,8}. Due to these facts, chances of erroneous interpretations are quite high.

Snap Crackle & Pop need more precise normative data of neurophysiologic laboratories, according to local population and need of more expertise.

CONCLUSION

Electromyographer as well as neurologist should be aware about the normal variants/artifacts like Snap Crackle & Pop, rather than label the patients/individuals with any worst neurologic disorder like motor neuron disease.

Further large studies may be more elaborative and helpful in addressing the issue and any possible mechanism why young healthy male patients having this variant?

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